Clinical Handbook of Fear and Anxiety

Maintenance Processes and Treatment Mechanisms

Edited by
JONATHAN S. ABRAMOWITZ AND SHANNON M. BLAKEY

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AMERICAN PSYCHOLOGICAL ASSOCIATION
Washington, DC

To my loving family: Stacy, Emily, and Miriam
—JONATHAN S. ABRAMOWITZ

*To Brett, Susan, Brittany, and Grant: Thank you
for your endless love and support*
—SHANNON M. BLAKEY

*To all of the patients and therapists we've worked
with and learned from*
—JONATHAN S. ABRAMOWITZ & SHANNON M. BLAKEY

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PREFACE

Jonathan S. Abramowitz and Shannon M. Blakey

Clinicians and researchers in the field of mental health have traditionally operated as if the *Diagnostic and Statistical Manual of Mental Disorders* (fifth ed. [*DSM–5*]; American Psychiatric Association, 2013) and *International Classification of Diseases* (11th ed. [ICD–11]; World Health Organization, 2018) carve nature at its joints in delineating discrete anxiety and related disorders. This can be seen in the siloed approaches taken by the field's experts to developing conceptual models and treatment protocols for various *DSM*- and ICD-defined conditions. An array of empirically supported treatment manuals are available for different disorders, as if each problem requires a distinct intervention program. Yet, the *DSM–5* and ICD–11 delineates these disorders superficially—largely on the basis of how anxiety is manifested topographically (e.g., fear of social situations vs. obsessions and compulsions). However, a more careful look at the conceptual models and treatment packages across these conditions reveals a high degree of redundancy in their core underlying psychological processes (e.g., overestimates of threat), active treatment ingredients (e.g., exposure to feared situations/stimuli), and putative mechanisms of change (e.g., changes in cognition). At this more fundamental, functional level, anxiety and related disorders have more commonalities than differences.

Recognizing these issues, we take the perspective that the boundaries around anxiety and related disorders imposed by the *DSM–5* and ICD–11 are illusory. Moreover, we argue that the disorder-driven approach in treatment manuals compromises efficiency and efficacy in the treatment of clinical anxiety. Clinicians are traditionally trained to follow separate treatment manuals for each disorder, as if they were distinct, but this is a cumbersome method for acquiring broad competency in providing psychological treatment.

In addition, although manuals serve an important purpose in carefully controlled research studies, they too often emphasize clinical technique and obscure the recognition that the same evidence-based psychological processes and active ingredients in therapy are broadly applicable across anxiety disorders. Manuals are also generally written with an assumption that one size fits all, though most patients with anxiety do not neatly fit diagnostic prototypes and often present with multiple, diverse, and complex manifestations of fear. Providing effective therapy for such individuals necessitates thinking beyond manuals and flexibly applying theoretical principles when implementing treatment.

Our blueprint for this handbook was to put under one cover a more efficient framework for understanding and targeting the processes shown to contribute to clinical anxiety in its various manifestations, irrespective of *DSM–5* or ICD–11 diagnosis (often referred to as *transdiagnostic processes*). Specifically, and diverging from a disorder-based focus, the chapters in this handbook delineate key empirically supported maintenance processes (e.g., threat overestimation) and theorized mechanisms of change (e.g., inhibitory learning) driving treatment efficacy. It is our view that understanding, assessing, and treating clinical anxiety at this functional level allows clinicians to use cognitive and behavioral methods to their maximum capacity. We have asked authors to produce clinically oriented chapters that integrate conceptual and practical content across the handbook's two parts. The chapters in Part I focus on various processes shown to maintain clinical anxiety, highlighting their conceptual significance, methods of assessment, and implications for treatment. The chapters in Part II focus on candidate mechanisms of change thought to explain how treatment works, describing methods for implementing therapeutic techniques that activate the particular change mechanism.

This handbook represents a progressive, "post-*DSM*/ICD" approach to understanding and treating clinical anxiety. In our own clinical work—and in training other therapists—we often encounter frustration with the existing diagnostic paradigm and its barriers to the efficient use of empirically supported psychological treatments. It is our hope that this handbook enables clinicians working with patients with anxiety to slip the restrictive bonds of *DSM–5* and ICD–11 diagnoses and treatment manuals and operate more flexibly and with a richer understanding of cognitive and behavioral principles and mechanisms of change.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Washington, DC: Author.

World Health Organization. (2018). *International classification of diseases, 11th revision*. Retrieved from https://icd.who.int/

MAINTENANCE
PROCESSES

Introduction to Part I

Why Psychological Maintenance Processes?

Shannon M. Blakey and Jonathan S. Abramowitz

Anxiety, broadly defined, is a natural reaction experienced by all living animals to perceived threat and manifested via cognitive (e.g., racing thoughts), physiological (e.g., autonomic arousal), and behavioral responses (e.g., escape, avoidance). Anxiety is universal and normal, and it is essential for survival. Consider our evolutionary ancestors: If early human beings did not fear and avoid faster and stronger predators, our species would likely have died out long ago. Yet despite this, many individuals experience recurrent episodes of clinical anxiety—excessive or inappropriate anxiety that is disproportionate to the true degree of danger present in a given (or anticipated) situation. If anxiety can be considered a natural and adaptive "alarm reaction" to perceived threat, then clinical anxiety represents a "false alarm." In standard diagnostic and classification systems, problems with clinical anxiety are often labeled as generalized anxiety disorder, panic disorder, agoraphobia, social anxiety disorder, specific phobia, obsessive-compulsive disorder (OCD), body dysmorphic disorder, posttraumatic stress disorder, and illness anxiety disorder. These anxiety-related disorders constitute the most common class of mental health complaints (Kessler, Chiu, Demler, & Walters, 2005) and are associated with substantial functional impairment and economic burden (e.g., DuPont et al., 1996; Greenberg et al., 1999).

Historically, the treatment and study of clinical anxiety have been dominated by a "disorder focus" (Deacon, 2013). Indeed, clinicians and clinical scientists tend to think in terms of the diagnostic labels described in standard classification manuals, particularly the fifth edition of the American Psychiatric Association's (2013) *Diagnostic and Statistical Manual of Mental Disorders* and the 11th edition of the World Health Organization's (2018) *International Classification of Diseases*. Researchers tend to be interested in understanding the

epidemiology, etiology, and maintenance of one or more specific disorders, usually with the goal of developing more effective treatments for such disorders. Clinicians are also likely to proceed by conducting diagnostic assessments and then targeting disorders one at a time in treatment (especially because many treatment programs are developed for single, specific disorders).

To be sure, the traditional diagnosis-driven approach has advanced the understanding and treatment of many anxiety disorders as defined in standard classification manuals. However, there is marked similarity in the psychological processes that are involved in the development and maintenance of anxiety across conditions. Research has found stunning overlaps in particular cognitive (e.g., the tendency to overestimate threat) and behavioral (e.g., the use of safety behaviors) phenomena that are observed across anxiety and related disorders. Such processes may exert varying amounts of influence, depending on the manifestation of anxiety, or have different themes across clinical disorders (e.g., selective attention toward feared contaminants in OCD and toward internal sensations in panic disorder), but the fundamental processes and their contribution to the maintenance of clinical anxiety are relatively stable transdiagnostically.

Furthermore, these processes occur on a continuum with normality and do not represent biological "defects" or "malfunctions." Rather, they are biased forms of thinking, fear-driven ways of behaving, and other individual difference variables and interpersonal processes that are also observed in people who do not meet diagnostic criteria for anxiety disorders. Individuals given a psychiatric diagnosis of an anxiety or related disorder differ from "nonclinical" individuals only in the frequency, intensity, or duration of these processes. There also is a marked similarity in the techniques used in effective psychological treatment for anxiety and related disorders (the topic of Part II of this handbook), which mostly serve to correct the aforementioned psychological maintenance processes.

Overemphasis on psychiatric diagnosis also becomes frustratingly unhelpful for many clinicians. In some cases, an individual with clinically significant anxiety does not actually meet diagnostic criteria for any anxiety-related disorder; in others, someone with a conceptually linked set of fears may receive several anxiety-related diagnoses. In still other cases, the single "correct" diagnosis is difficult to determine. Imagine a woman who describes fears that she has colon cancer and reports that she pays close attention to the perceived signs of such an ailment (e.g., tiredness, abdominal discomfort, changes in the color and consistency of stool), seeks immediate reassurance and medical attention whenever she notices these signs, and experiences panic symptoms when she thinks about colon cancer or believes she has spotted a symptom. Would a clinician be inclined to diagnose her with OCD, illness anxiety disorder, or panic disorder? Alternatively, consider a man who reports crippling anxiety in crowds because such situations elicit hyperventilation, fears of having a "full blown" panic attack, and worries that he will not be able to control himself such that other people will notice him screaming or acting foolishly. Would

a clinician diagnosis him with panic disorder, agoraphobia, or social anxiety disorder? More important—and in line with the aims of this handbook— would different answers to these questions dictate fundamentally different treatment approaches? *Should* different answers to these questions dictate fundamentally different treatment approaches?

OVERVIEW OF PART I

When these diagnostic dilemmas are considered with the transdiagnostic overlap in psychological processes and their continuum with normality, then the categorical conceptualization of the anxiety-related disorders does not reflect reality. The purpose of Part I of this handbook is to facilitate a shift in perspective away from the traditional disorder-focused approach and toward an understanding of the psychological maintenance processes common across the myriad presentations of anxiety. Research has shown that the anxiety-related disorders share, to a great extent, several key psychological mechanisms that contribute to the development and persistence of clinical anxiety. Most— if not all—presentations of clinical anxiety may be understood in terms of these overlapping phenomena, which also have key assessment and treatment implications.

To this end, the chapters in Part I identify and elucidate 13 empirically supported psychological processes relevant to the maintenance of clinical anxiety. Transdiagnostic cognitive behavior theory recognizes (a) the impossibility of definitively identifying the root cause of a psychological condition, (b) the inability to undo the past (e.g., "unexperience" trauma), and (c) equifinality in the development of psychological conditions (i.e., that multiple experiences—or combinations of experiences—may lead to the same psychological symptoms). Although potential etiological factors are acknowledged, they do not necessarily serve as practical targets for change and are therefore given minimal attention over the course of therapy. That is not to say that the study of etiological variables is not important; such research may inform prevention and early intervention programs. Rather, the cognitive and behavioral factors demonstrated by empirical evidence to be involved in the maintenance of anxiety problems serve as the focus of Part I of this handbook.

Each chapter in Part I follows a general format in which the psychological maintenance process is first defined and described. Next, authors discuss the process's conceptual implications (i.e., how it contributes to the maintenance of clinical anxiety) and describe methods for assessing the process, including self-report, interview, and observational methods. Finally, authors highlight the clinical implications of the process using case examples to illustrate how a therapist might encounter this process in their clinical work with patients presenting with clinical anxiety.[1] We hope that these chapters will move the

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[1]All clinical case material has been altered to protect patient confidentiality.

reader from a disease-based understanding of clinical anxiety toward viewing these problems as a self-perpetuating cycle in which an exaggerated threat response to a particular set of stimuli is perpetuated by cognitive and behavioral psychological processes.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Deacon, B. J. (2013). The biomedical model of mental disorder: A critical analysis of its validity, utility, and effects on psychotherapy research. *Clinical Psychology Review*, *33*, 846–861. http://dx.doi.org/10.1016/j.cpr.2012.09.007

DuPont, R. L., Rice, D. P., Miller, L. S., Shiraki, S. S., Rowland, C. R., & Harwood, H. J. (1996). Economic costs of anxiety disorders. *Anxiety*, *2*, 167–172. http://dx.doi.org/10.1002/(SICI)1522-7154(1996)2:4<167::AID-ANXI2>3.0.CO;2-L

Greenberg, P. E., Sisitsky, T., Kessler, R. C., Finkelstein, S. N., Berndt, E. R., Davidson, J. R., . . . Fyer, A. J. (1999). The economic burden of anxiety disorders in the 1990s. *The Journal of Clinical Psychiatry*, *60*, 427–435. http://dx.doi.org/10.4088/JCP.v60n0702

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month *DSM–IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 617–627. http://dx.doi.org/10.1001/archpsyc.62.6.617

World Health Organization. (2018). *International classification of diseases* (11th ed.). Geneva, Switzerland: Author.

1

Overestimation of Threat

Jonathan S. Abramowitz and Shannon M. Blakey

Elaine was a corporate accountant who had an intense fear of public speaking.[1] Normally, because of the nature of her work, she was not required to speak in front of groups. Every now and then, however, her supervisor would ask her to provide account updates at department meetings. This involved getting up and speaking about budgets and expenses for 15 minutes in front of a conference room filled with her coworkers. Although Elaine's presentations were routinely satisfactory and she received only positive feedback after each one, the days leading up to these meetings were always filled with dread. Elaine would anticipate worst case scenarios, such as "I'll mispronounce a patient's name," "I'll be so anxious that I'll sweat in front of everyone—I would die from the embarrassment," and "What if I give inaccurate figures?" Before every presentation, Elaine would convince herself that she would be fired on the spot because of her mistakes and miscues. Then, she told herself, she would never be able to get another accounting job in the city where she lived. As a way of preventing such feared disasters, Elaine rehearsed excessively for her presentations, making sure to pronounce everything correctly and checking her numbers at least five times. She also wore layered clothing and extra makeup to make sure that any signs of anxiety such as blushing or sweating wouldn't be noticeable.

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[1]All clinical case material has been altered to protect patient confidentiality.

A close look at the components of Elaine's fear reveals that she is over-estimating the threat associated with public speaking. Indeed, despite her negative thoughts, she had received only positive feedback about the presentations she gave. Moreover, even if she did make mistakes or appear anxious, this would probably not result in the drastic consequences she feared. To be more specific, Elaine demonstrates two common types of threat overestimations: (a) overestimates of the likelihood (or probability) of feared events and (b) overestimates of the severity (or costs) of feared events.

Likelihood overestimation, also known as "jumping to conclusions," occurs when negative events are judged as being much more probable than they are in reality. For example, the fear of flying is among the most common phobias (Barlow, 2004; Fredrikson, Annas, Fischer, & Wik, 1996), and many sufferers avoid flying based on the belief that their plane will crash. The probability of a plane crash, however, is exceptionally low. In Elaine's case, she overesti-mated the likelihood of making mistakes and others noticing her anxiety even though she routinely performed well and received positive feedback.

Severity overestimation, also termed "catastrophizing," implies viewing an event as "truly awful," "unbearable," or "devastating" (i.e., 101% bad) when, in reality, it is tolerable, even if undesirable, unpleasant, or emotionally or physically painful. Examples of severity overestimations include thinking that a dog bite would be excruciating, a poor grade would mean a lifetime of fail-ure and disappointment, and an emotional trauma would "ruin my life for-ever." Elaine's beliefs that she would "die of embarrassment" and be fired are overestimates of the severity of making mistakes and appearing anxious.

Whereas overestimates of threat are common in the general population regardless of psychological well-being, these thinking errors are most fre-quently observed among those with clinical anxiety. Moreover, the content of such overestimates are typically specific to the nature and triggers of one's fear. Although these beliefs might map on to particular diagnostic categories (e.g., disorders described in the *Diagnostic and Statistical Manual of Mental Dis-orders* [fifth ed.; *DSM–5*; American Psychiatric Association, 2013]), as we dis-cuss later in this chapter, they are a transdiagnostic process in that they operate independent of diagnostic status.

CONCEPTUAL IMPLICATIONS

In this section, we place the phenomenon of threat overestimation within a conceptual framework and discuss how it presents across different presenta-tions of fear and anxiety.

Cognitive Model of Emotion

The concept of threat overestimation is drawn from cognitive and cognitive behavioral models of emotion, which emphasize the role of thinking (e.g.,

beliefs, assumptions) in the production of feelings. In particular, Beck's (1976) cognitive specificity model stipulates that feelings and emotions are caused not by situations or stimuli per se, but rather (in large part) by how the person ascribes meaning to certain situations or stimuli. Moreover, particular emotional responses are linked with specific interpretations. For example, interpretations concerned with loss lead to depression, whereas the perception that one has deliberately been treated with disrespect leads to anger. In a similar vein, unrealistic (overestimated) perceptions of the degree of threat or danger lead to anxiety (e.g., Amir, Foa, & Coles, 1998; Beck, Emery, & Greenberg, 2005).

Elaine's case illustrates this point: It is not the presentations that are the problem per se, but rather how she thinks about what will happen in these meetings that leads to her distress. From the cognitive perspective, Elaine's exaggerated beliefs about (a) what could happen during a presentation and (b) how awful the fallout would be are the core process leading to her fear and anxiety (depicted in Figure 1.1). In this way, overestimates of threat maintain clinical anxiety and fear by directly generating these emotional responses. Accordingly (and as is addressed in several chapters in Part II of this handbook), a critical focus of the treatment of clinical fear and anxiety is challenging and correcting overestimates of threat, as opposed to trying to modify the feared situation or stimulus itself.

It is worth noting that many people overcome irrational fears on their own—their overestimates of threat seem to self-correct. Yet for individuals with clinical anxiety, something appears to prevent such self-correction. Again, consider that Elaine remains fearful of giving work presentations despite receiving positive feedback. She does not seem to notice that her actual performance in the conference room fails to match her beliefs that she is at risk of making mistakes and being fired. Why doesn't she recognize that she is a more skilled presenter than she thinks? Why doesn't she realize she is unlikely to lose her job? More generally, why don't anxious and fearful individuals recognize that they are making mistakes in their thinking and simply correct them?

Role of Safety Behaviors

One reason that threat overestimates persist in the face of even dramatic disconfirmatory evidence is that they lead to *safety behaviors*—efforts to detect,

FIGURE 1.1. The Relationship Between Events, Beliefs, and Emotional Consequences

Activating event	**Beliefs**	**Consequences**
Upcoming presentation	• *I will make mistakes* • *I will appear anxious* • *I will be fired* • *I will never be able to find another job*	Anxiety, fear
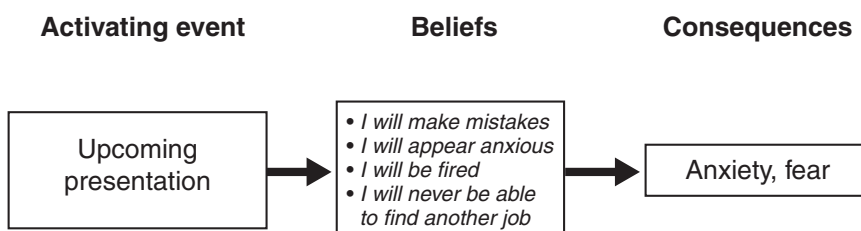
escape from, or avoid the feared outcome (as discussed in detail in Chapter 2). Such behaviors may be adaptive when an objective threat is present (e.g., washing one's hands after touching raw meat while preparing a meal), yet when threat is objectively low, safety behaviors maintain threat overestimates by causing the person to erroneously think that he or she narrowly averted catastrophe (Salkovskis, 1991). Elaine's practice of excessive rehearsal before her presentations may be considered a safety behavior because the risk and cost of making a mistake are objectively low. Yet when her presentation goes well and she does not get fired, she believes that it was the rehearsal that prevented these negative outcomes, rather than concluding that she is generally adept at giving presentations. Thus, as long as she continues performing safety behaviors, her overestimates of threat remain unchallenged (e.g., Salkovskis, Clark, Hackmann, Wells, & Gelder, 1999).

Role of Information-Processing Biases

As part of the normal human fear (i.e., fight-or-flight) response, individuals automatically filter information in ways that confirm their overestimates of threat. Such a bias serves to protect us from harm when danger is actually present; yet, this way of thinking preserves inaccurate overestimates of the likelihood and severity of threat when the risk of harm is objectively low.

One such information-processing bias is selective attention to threat cues (as discussed in detail in Chapter 12). It is adaptive to be vigilant for sources of harm when danger is perceived—not doing so could be deadly. Accordingly, the perception of threat is naturally accompanied by an automatic shift in attention to the source of danger. As a result, the environment may seem especially dangerous despite an objectively low risk of danger. Using Elaine as an example, she might become highly attentive to anything that could be perceived as a threatening response to her presentation, such as colleagues whispering in the audience, which might be misinterpreted as a sign that someone noticed a mistake.

A similar mechanism engendered by overestimates of threat is confirmation bias. The survival value of assuming that a situation is dangerous is significantly higher than that of assuming safety. Accordingly, when we perceive danger, we automatically seek information to confirm the risks. Yet if the perception of danger is based on erroneous overestimates of threat, this results in the collection and misinterpretation of benign or ambiguous information as danger confirming (while simultaneously discounting danger-disconfirming evidence), which maintains the faulty threat estimates. Elaine, for example, might scan the conference room looking for signs of disapproval (e.g., a supervisor frowning) and may even misinterpret ambiguous feedback (e.g., a colleague's failure to nod in approval) as confirming her threat overestimates.

Memory bias—the tendency to easily remember information that is consistent with fear-related beliefs—also maintains overestimates of threat (as

covered in detail in Chapter 11). Thus, someone like Elaine might easily remember and base her predictions on one instance in which she mispronounced a word while rehearsing two years ago. Together, selective attention, confirmation bias, and memory bias work to increase the probability that fear cues are noticed, encoded into memory, and subsequently retrieved in related future situations, thereby maintaining overestimates of threat.

Finally, the experience of anxiety itself in feared situations often gives rise to the tendency to infer further danger. This phenomenon is often referred to as *emotional reasoning* because people mistakenly look to their emotional state for information about the dangerousness of a given situation (Arntz, Rauner, & van den Hout, 1995). Returning to Elaine, as she begins to experience shakiness and "butterflies" in her stomach in the moments before she stands to give her presentation, her emotional reasoning that she will inevitably make mistakes and be visibly anxious contributes to the vicious cycle that maintains her threat overestimates over time.

Origins of Threat Overestimation

One way threat overestimates may develop is through a direct, negative experience with an object or situation. Following a dog bite, for example, one may come to expect that dogs are dangerous. Still, many people have traumatic experiences but never develop overestimates of threat or excessive fear (e.g., Ollendick, King, & Muris, 2002). *Vicarious conditioning* (i.e., modeling), which refers to learning that occurs through observing others, is another pathway to the development of threat overestimates. Specifically, we may learn to overestimate the likelihood or severity of certain objects or situations simply by witnessing other people's experiences or by observing others act in a fearful manner (Mineka & Zinbarg, 2006). Third, overestimates of threat might be transmitted by parents, peers, the media, and other sources. For example, the message that germs are ubiquitous, dangerous, and require diligent cleansing is often conveyed by well-meaning family members, television commercials for antibacterial products, and sensationalistic reports in the media.

ASSESSMENT

Overestimates of threat are idiosyncratic to particular situations and the people who experience them. Many anxious individuals express these types of beliefs quite readily during the initial interview—in fact, they might be framed as the presenting problem or reason for seeking help. For example, "I've stopped driving because I'm afraid I'll cause an accident," and "my husband was diagnosed with high blood pressure and I'm afraid he's going to die and leave our family in financial ruin." If such beliefs are not immediately volunteered, they might be more or less easy to infer from any descriptions of triggering situations or avoidance behavior. For example, it might be

anticipated that someone who carries hand sanitizer at all times overestimates the threat of contamination. It is, however, important to consider such inferences as hypotheses that can be tested by further interviewing. For example, someone afraid of flying might fear this situation based on overestimates of the likelihood of (a) a crash caused by engine failure, (b) a terrorist hijack, or (c) a panic attack. Therefore, direct and open-ended questions are critical in assessing overestimates of threat.

To this end, during a conceptually driven interview, a clinician might explain the relationship between activating events (triggers), beliefs and interpretations (e.g., overestimates of threat), and emotional and behavioral consequences, soliciting personalized examples of each. Some questions can help to elicit overestimates of threat:

- What goes through your mind when you are in a triggering situation?
- What specifically do you worry about in this situation?
- What leads you to avoid (or perform a safety behavior in) this situation?
- What is the worst thing that could happen in this situation?
- What do you tell yourself would be so bad about the situation?

Within such a clinical interview, the *downward arrow technique* (Beck, 1976; Beck et al., 2005) is a helpful strategy for identifying specific overestimates of threat (beliefs about probability and cost). This involves identifying an anxiety-provoking situation and asking questions about the anticipated outcomes, including how likely and how awful they would be. The clinician continues to ask the same (or a similar) question until the patient provides a conclusive statement that contains an exaggerated belief about likelihood or severity. Extreme and unconditional statements (i.e., terms such as *always*, *never*, and *awful*) also serve as verbal cues for overestimates of threat.

Because clinical interview data are not always complete, we recommend that psychometrically validated self-report instruments be used as well. These have the advantage of including carefully worded questions that have demonstrated validity and reliability. Moreover, they allow a clinician to compare the patient's responses to well-established norms. Accordingly, questionnaires are valuable for screening purposes, to corroborate information obtained in a clinical interview, and to bring to light overestimates of threat that might not otherwise be reported during the interview.

Several surveys and self-report measures assess overestimates of threat across various fear domains, many of which are freely available online and in the published literature. Examples are listed in Table 1.1.

CLINICAL IMPLICATIONS

As we have discussed, overestimates of threat drive the vicious cycle of anxiety across domains of fear, whether or not they meet criteria for a psychological disorder as defined by the *DSM–5* or the *International Classification*

TABLE 1.1. Self-Report Assessment Measures of Overestimates of Threat Across Different Types of Feared Stimuli

Category and measure name	Source
Animals	
Spider Phobia Beliefs Questionnaire	Arntz, Lavy, van den Berg, and van Rijsoort (1993)
Natural environments and disasters	
The Claustrophobia Questionnaire	Radomsky, Rachman, Thordarson, McIsaac, and Teachman (2001)
Agoraphobic Cognitions Questionnaire	Chambless, Caputo, Bright, and Gallagher (1984)
Negative evaluation	
Probability Questionnaire and Cost Questionnaire	Foa, Franklin, Perry, and Herbert (1996)
Beliefs About Appearance Scale	Spangler and Stice (2001)
Unwanted intrusive thoughts	
Obsessive Beliefs Questionnaire–44	Steketee and Obsessive Compulsive Cognitions Working Group (2005)
Thought-Action Fusion Scale	Shafran, Thordarson, and Rachman (1996)
Somatic cues	
Anxiety Sensitivity Inventory–Revised	Taylor and Cox (1998)
Contamination	
Contamination Cognitions Scale	Deacon and Olatunji (2007)
Traumatic events and posttraumatic sequelae	
Posttraumatic Cognitions Inventory	Foa, Ehlers, Clark, Tolin, and Orsillo (1999)
Blood, injection, and injury	
Dental Anxiety Inventory	Stouthard, Mellenbergh, and Hoogstraten (1993)

of Diseases (10th ed. [ICD–10]; World Health Organization, 1992). Commonly encountered overestimates of the probability and costs of harm for many fear domains are presented in Table 1.2. Next, we discuss in detail the presentation of threat overestimates as they are observed in a number of anxiety- and fear-related contexts.

Fear of Animals

Fears of animals are common across the lifespan and are typically classified as specific phobias. Although commonly feared animals—such as dogs, spiders, and snakes—can pose some inherent danger, these risks are generally low. Overestimates of threat in people with animal fears tend to involve concerns about physical harm, such as estimates of the likelihood of suffering pain or physical injury from being bitten or otherwise attacked. For some animal

TABLE 1.2. Common Overestimates of Threat Across Different Types of Feared Stimuli

Likelihood overestimates	Severity overestimates
Animals	
The snake will bite me.	I will have to have my arm amputated.
The bee will sting me.	The pain of a bee sting is unbearable.
Natural environments and disasters	
I won't be able to breathe in the elevator.	I will die from suffocation.
The storm will turn into a tornado as it passes over my home.	The tornado will tear apart my home and I'll die in the rubble.
Negative evaluation	
People will think I am boring.	No one will hire me and I will have to go on Social Security.
Others will notice and be repulsed by my crooked nose.	I will never find someone who will want to marry me.
Unwanted intrusive thoughts	
Violent thoughts lead to violent actions.	I will smother and kill my husband in his sleep.
If I can't remember locking the door, I may have forgotten to.	Burglars will break into my home and kill my family.
Somatic cues	
I will have a panic attack on the bus.	I'll go crazy and cause an awful scene.
If I get dizzy, it probably means I have a brain tumor.	The tumor will be cancerous and fatal.
Contamination	
If I eat milk on the "best by" date, I will get sick.	Getting sick will ruin my whole week.
If I use a public toilet, I could contract a disease.	If I use a public toilet, I will get HIV/AIDS and die.
Traumatic events and posttraumatic sequelae	
If I am alone with a man, he will assault me.	If I am assaulted, I couldn't have a meaningful future.
If my son hasn't texted me, it means his plane crashed.	My son might be dying in a field somewhere.
Blood, injection, and injury	
If I get an IV put in, I will faint.	If I faint, I'll fall out of the chair and get a concussion.
If I play baseball, I'll end up breaking my arm.	The pain would be unbearable and I'd cause a scene.
"Not just right experiences"	
If the picture frames are crooked, I'll have bad luck.	My child's school will burn down and it will be my fault.
If I don't put my left shoe on first, I'll feel "uneven."	The discomfort would spiral out of control and never go away.

fears, anxiety stems from overestimates of the severity of an attack, such as choking to death from an allergic reaction to a bee sting. These threat estimates are usually easily articulated by individuals with animal fears.

In other instances, overestimates of severity relate to the emotional and physical reaction experienced when one encounters a feared animal or insect (e.g., disgust, nausea), such as the belief that the unpleasant feelings will persist forever or spiral to unbearable levels. For example, someone afraid of cockroaches may report that roaches are "gross" or "disgusting." Similarly, overestimates of the dangerousness of anxious arousal and possible panic attacks (i.e., anxiety sensitivity, as discussed in Chapter 4) can play a role in animal phobias (Mcnally & Steketee, 1985). For instance, a man may believe that being in the same room as a spider will lead to such intense anxiety that it will spiral out of control and lead to a loss of consciousness, perhaps placing him at elevated risk of harm and negative evaluation from others.

In response to their exaggerated estimates of threat, individuals who fear animals may avoid proximity to the feared animal and situations in which they believe they will encounter the animal. This avoidance pattern prevents the person from having opportunities to learn that the risk of harm from such animals (as well as associated emotional reactions) is acceptably low. If a child, for instance, never goes to her friend's home because there is a dog, she won't have the opportunity to learn that the dog is much more likely to sniff or lick her than to bite her.

Fear of Natural Environments and Disasters

Overestimates of threat, in various forms, also play a role in the fear of certain situations such as standing on a high ledge, driving a car, being in or on water, or being in a crowded or confined place or a storm (i.e., specific phobias of natural environments). Likelihood overestimates often relate to rare (although possible) occurrences, such as a plane crash, elevator accident, drowning, or having one's home (or life) destroyed by a lightning strike. Severity overestimates often concern beliefs about catastrophes seemingly linked to the feared situation (e.g., "if lightning hits the house, it will cause an explosion and we will all die").

Clinicians, however, should be aware that individuals with situational fears may also overestimate the dangerousness of experiencing anxiety symptoms in the feared situation. For instance, a man who avoided riding escalators believed that if he became too anxious, he would lose control and wildly push people out of his way in his attempt to escape. People with fears of enclosed places, such as being in a magnetic resonance imaging scanner (as well as other claustrophobic situations), often interpret anxiety-related sensations, such as shortness of breath, as indicating that they are running out of air and suffocating (e.g., Radomsky, Rachman, Thordarson, McIsaac, & Teachman, 2001). Those who fear crowded areas, such as busy shopping centers and

stadiums, overestimate the danger of not being able to "escape" in the event they become anxious or have a panic attack. Other times, severity overestimates focus on the embarrassment of becoming anxious, having a panic attack, or losing one's composure in public.

The idiosyncratic nature of these beliefs and interpretations highlights the need for a thorough assessment of the cognitive aspects of the fear symptoms. Such overestimates often lead to avoidance, safety cues (e.g., being with a "safe" person), or the use of antianxiety medication (i.e., benzodiazepines), which might decrease anxiety in the short run but prevent the correction of threat overestimates in the long term.

Fear of Negative Evaluation

As the example of Elaine illustrates, overestimates of threat contribute a great deal to fears of social and performance situations and are often observed among individuals diagnosed with social anxiety disorder or body dysmorphic disorder. The fundamental overestimates of threat concern the probability and costs of being observed by others, appearing foolish, being criticized, and experiencing embarrassment. People with this presentation of fear thus overestimate the likelihood that others are paying close attention to them and scrutinizing them for minor mistakes, instances of imperfect speech or behavior, or flaws in their appearance. Although interpersonal criticism and rejection is rarely life threatening, socially anxious individuals often overestimate the costs of negative evaluation or ridicule, and perceive it as catastrophic—perhaps on par with serious injury or death. Some might believe it will manifest in the disapproving thoughts and feelings of others, or perhaps in overt ridicule or discrimination.

Overestimates of threat lead to avoidance and other behaviors to reduce the possibility of being noticed, appearing foolish, and being negatively evaluated. These actions maintain the overestimates of threat by preventing the individual from learning that others are generally unconcerned with mistakes and imperfections, and that the anxiety associated with negative evaluation is actually transient and manageable.

Fear of the Significance or Meaning of Thoughts

People can also overestimate the threat associated with unwanted thoughts. Obsessions, as defined in the *DSM–5* criteria for obsessive-compulsive disorder (OCD), for example, are characterized by overestimates of the costs of having certain unwanted or senseless thoughts about topics such as sex, violence, blasphemy, and harm. Indeed, research shows that people diagnosed with OCD catastrophically misinterpret their intrusive, unwanted thoughts, images, and doubts as personally significant or as signs of some deeply rooted failing. They might fear punishment from God for thinking "sinful" thoughts or be concerned that they will impulsively act on their sexual or violent

intrusions (Obsessive Compulsive Cognitions Working Group, 2005; e.g., "If I think too much about incest, I will lose control and rape my mother"). Others believe that their intrusive unwanted thoughts mean that deep down they want something awful to happen (e.g., "Thinking about rape means I want to rape someone").

To prevent the feared consequences of unwanted thoughts (and to reduce the thought itself, along with its associated discomfort), individuals with catastrophic beliefs about thoughts often resort to strategies such as mental rituals (e.g., replacing a "bad" thought with a "good" one), overanalyzing, or seeking reassurance about their thoughts. They might also avoid situations and stimuli that trigger such thoughts, and repeat simple behaviors (e.g., flipping light switches) until the activity can be completed without the unwanted thought. Research, however, demonstrates that negative unwanted thoughts are harmless normal occurrences (i.e., mental noise; e.g., Rachman & de Silva, 1978; Salkovskis & Harrison, 1984), and thus the sorts of strategies mentioned above block the person from correcting overestimates of threat and learning that it is normal to have even very unpleasant thoughts.

Fear of Somatic Cues

Concerns about one's bodily changes and sensations feature prominently in most anxiety and related disorders. The specific fears associated with somatic cues are principally differentiated by three factors: (a) focus on immediate versus long-term feared health outcomes (e.g., the belief that one either currently has or will eventually acquire a disease), (b) preoccupation with arousal-related (i.e., anxiety-related) versus nonarousal-related sensations, and (c) anticipation of an individual versus interpersonal negative outcome (e.g., the fear that having a panic attack in public will lead to medical catastrophe or social humiliation). Despite the partitioning of psychological disorders in formal diagnostic manuals such as the *DSM–5* and ICD–10, individuals who fear somatic cues often present with symptoms that cut across these diagnostic categories, anxious individuals meeting diagnostic criteria for different disorders may endorse identical fears about somatic cues, and many individuals who fear somatic cues may not formally meet diagnostic criteria for any psychological disorder. Therefore, a transdiagnostic approach to conceptualizing the fear of somatic cues is especially advantageous over the disorder-driven approach embodied by diagnostic manuals.

Overestimates of the likelihood of the harm resulting from benign and ubiquitous somatic cues such as anxious arousal (e.g., pounding heart), unexpected sensations (e.g., muscular twitching), or ambiguous bodily cues (e.g., rash) tend to be focused on possible negative physical, mental–cognitive, or social consequences (Taylor, 1999; Taylor et al., 2007). For example, someone with panic disorder may misinterpret a pounding heart as a heart attack, someone with illness anxiety disorder may mistake bloodshot eyes for a symptom of Ebola, and someone with generalized anxiety disorder might

appraise muscle tension as a sign that something awful might happen. Alternatively, someone with OCD might interpret trembling hands to mean that she is about to lose control and act on unwanted impulses to harm, whereas someone with posttraumatic stress disorder may be afraid that difficulties concentrating indicate that he is "going crazy." Finally, someone with agoraphobia may fear that fainting at the grocery store would cause an "embarrassing scene," while someone with social anxiety disorder might predict that others would negatively evaluate him for blushing while on a date. Individuals with such beliefs tend to pay close attention to their bodies in order to detect feared somatic cues and prevent anticipated negative consequences (Schmidt, Lerew, & Trakowski, 1997).

Overestimates of the severity of harm related to feared somatic cues can be easily elicited through clinical interview and self-report assessments. Fears about the physical or medical consequences of bodily cues tend to involve immediate threats to one's life (e.g., heart attack) or serious and potentially fatal long-term illnesses (e.g., lung cancer). People who are preoccupied with the potential cognitive effects of feared somatic cues tend to anticipate complete mental breakdown (e.g., permanent insanity, "losing control and doing something horrible," having a "psychotic break"). Yet other individuals may be more concerned with being negatively evaluated by others for publicly exhibiting anxiety symptoms or afraid of experiencing intolerable levels of discomfort associated with intense physical arousal.

Fear of Contamination

The fear of contamination is most pertinent to illness anxiety disorder and OCD. Individuals with this concern fear stimuli or situations perceived to be contaminated, such as public restrooms, household chemicals, hospitals, or even people who have a serious illness (e.g., HIV/AIDS). Although the prototypical case of contamination fear involves a preoccupation with physical contaminants, some people instead experience mental contamination: feelings of internal dirtiness that arise from thinking about or imagining a subjectively unpleasant, immoral, or disgusting scenario (e.g., imagining committing incest or touching feces; Rachman, 2006). To reduce the physical and emotional feelings of contamination and associated distress, individuals often avoid sources of contamination or "dirty thoughts" and tend to engage in excessive washing, cleaning, thought neutralization, and other "decontamination" efforts.

Like any other condition involving clinical fear or anxiety, the fear of contamination is largely driven by overestimates of the likelihood and severity of contamination. Contracting an illness is the most obvious and common feared outcome of coming into contact with contaminants. Yet one may be concerned with spreading or passing on contamination to others. For example, a woman who worked as a nurse feared that if her hands were contaminated with traces of "fecal matter germs," she would endanger her entire family by preparing a dinner that they all would eat. Exaggerated beliefs about one's

own susceptibility to illness often go hand in hand with overestimates of the likelihood of contracting a disease from a contaminant, in that individuals tend to believe that germs are lurking everywhere, they are guaranteed to ingest germs, and the germs will inevitably cause them to contract an awful disease.

A less common class of feared consequences involves taking on the characteristics, typically undesirable ones, of other people through being contaminated with their "germs." For example, one woman feared that if she touched items belonging to her grandmother who had Alzheimer's disease, she would develop this disease within a year. Thus, overestimates of the probability of certain feared outcomes may derive from illogical or magical beliefs about the transmission and spread of illness (Rachman, 2004).

Contamination-fearful individuals also tend to overestimate the severity of physical or mental contamination. Although some may even become fearful at the prospect of coming down with the common cold (e.g., "If I had to stay home from work, I would never be able to make up the hours I missed before payday"), most anxious individuals tend to fear contamination because they anticipate more catastrophic outcomes (e.g., contracting a sexually transmitted disease, developing a serious long-term or deadly illness). In some instances, individuals experience disgust rather than fear when they are near sources of contamination; accordingly, severity overestimates may also manifest as predictions that contamination-related disgust will be intolerable or incapacitating (e.g., "I can't stand feeling contaminated," "It would be too gross to be covered in germs," "If I were to be contaminated, I would never feel clean again").

As mentioned earlier, contamination fears generate urges to engage in unnecessary and excessive cleansing rituals (e.g., hour-long showers) or even avoid potential sources of contamination altogether. Unfortunately, whenever an individual avoids perceived contamination, he or she is deprived of the opportunity to learn firsthand that the feared contaminant does not pose a significant threat and that his or her distress would have decreased naturally over time anyway; consequently, mistaken estimates of threat remain unchallenged.

Fear of Traumatic Events and Posttraumatic Sequelae

Although most people who witness or directly experience traumatic events (e.g., sexual assault, severe motor vehicle accidents) do not suffer long-term psychological consequences, some develop posttraumatic stress disorder symptoms in the wake of such an incident (e.g., Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992). That is, whereas "normal" posttraumatic reactions (e.g., nightmares, increased startle) typically dissipate over time as the person processes the event, these symptoms persist and cause clinically significant distress and impairment for trauma survivors who go on to meet diagnostic criteria for posttraumatic stress disorder. Symptoms are often classified along four clusters (intrusion, avoidance, negative alterations in cognition and mood,

and alterations in arousal and reactivity; American Psychiatric Association, 2013), but a common clinical feature of this condition is that survivors tend to hold exaggerated beliefs about the dangerousness of the world, other people, and even themselves (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999). For example, depending on the nature of the traumatic event(s), individuals with posttraumatic stress disorder might endorse beliefs such as "the world is a dangerous place" and "people cannot be trusted."

Clinicians working with trauma survivors should assess for two common themes related to overestimates of threat. The first concerns the fear of being retraumatized; because many survivors begin to view the world as unpredictable and unsafe after a trauma, they may feel especially vulnerable in situations they associate with their traumatic event (e.g., the neighborhood in which they were held at gunpoint). In effect, this may result in inflated estimates regarding the probability of transportation accidents, physical or sexual assault, or natural disasters. These likelihood overestimates tend to be accompanied by overestimates of the severity of retraumatization. Specifically, trauma survivors may believe that experiencing another traumatic event would be the end of the world (i.e., catastrophic), when in reality many individuals who experience multiple traumatic events are still able to live a meaningful and rewarding life. That is not to say that future traumatic events would not be horrific or frightening; rather, individuals who overestimate the likelihood and severity of retraumatization also tend to underestimate their ability to cope with and recover from trauma.

The second theme concerns catastrophic interpretations of the posttraumatic symptoms themselves as indicating an ongoing threat (e.g., Ehlers & Clark, 2000). For example, trauma survivors may come to believe extreme statements such as "Having uncontrollable nightmares mean I am losing my mind," "Being constantly 'on guard' will cause me to pass out from exhaustion," and "Being disconnected from others means I'll never be able to form meaningful relationships again." Moreover, mistaken beliefs about the likelihood and severity of posttraumatic symptoms often engender urges to avoid trauma-related distress altogether or engage in counterproductive coping efforts (e.g., self-medicate with alcohol or substances). These anxiety-reduction strategies ultimately exacerbate distress related to posttraumatic stress disorder, however, because they perpetuate overestimates of threat associated with the experience of posttraumatic stress symptoms.

The fear of traumatic events may also be clinically relevant to generalized anxiety disorder. Specifically, despite no evidence that a traumatic event will or has occurred, individuals with this disorder report substantial fear or dread that "something terrible" (e.g., a major accident) might happen and that the consequences of such an event would be disastrous (e.g., paralysis, death). Alternatively, people with generalized anxiety disorder may acknowledge that their anxiety and worry is disproportionate to the true probability of a feared event occurring, yet nevertheless believe that the worry surrounding the fear of a traumatic event is intolerable, unyielding, or will "spiral out of control."

Fear of Blood, Injection, and Injury

Fears related to blood, injection, or injury typically map onto the diagnostic category of specific phobia, although some people with OCD or illness anxiety disorder may also report these fears. Individuals preoccupied with blood, injection, and injury fear a range of stimuli including seeing blood, receiving injections, and undergoing dental and medical procedures. Some individuals are so distressed by blood, injection, and injury that they refuse (or find it extremely difficult) to undergo important medical procedures, become pregnant, or take careers in health care and medicine. The fear of blood, injection, and injury is also unique to clinical anxiety in that individuals may, in fact, faint upon exposure to these fear cues (Öst, 1992).

Overestimates regarding the likelihood and severity of exposure to blood, injection, and injury are heterogeneous and idiosyncratic. For some, these fears are driven by exaggerated beliefs about the probability and intensity of physical pain and its possible consequences (e.g., "The pain will be extreme and intolerable, and it will cause me to lose control and scream like crazy"). Others overestimate the probability of being directly harmed by the stimulus; for example, dying during a medical procedure or being contaminated by blood or needles that results in the acquisition of a serious illness. Many sufferers report prominent and aversive feelings of disgust (rather than fear) upon exposure to stimuli such as blood, wounds, and needles, which they report to be incredibly difficult to tolerate (e.g., "Blood is gross and I can't stand being near it or having it on me"). For individuals with a history of fainting, blood, injury, and injection cues may be feared because of their ability to cause this reaction. In these cases, although a person's estimates regarding the likelihood of fainting may be accurate (Öst, 1992), they often overestimate the severity of fainting (e.g., they mistakenly fear that fainting will lead to injury, medical emergency, or intolerable social embarrassment).

Most individuals with fears of blood, injection, and injury avoid these stimuli altogether (e.g., going years without a dental cleaning) to mitigate the perceived likelihood and/or severity of their feared outcome(s). In the long term, however, extreme avoidance not only comes at the price of their health and quality of life but also serves to maintain maladaptive beliefs about (a) the dangerousness of feared stimuli themselves, (b) the extreme emotional reactions they elicit, and (c) their inability to tolerate such reactions.

Fear of "Not Just Right Experiences"

The need to reorder, realign, repeat, or engage in other types of seemingly senseless ordering or arranging behaviors is consistent with one "type" of OCD (although individuals with OCD or high levels of perfectionism who do not meet diagnostic criteria for any psychological disorder might also display these symptoms). Individuals who present with complaints about "not just right experiences" (NJREs) tend to overestimate the negative consequences of feelings of "incompleteness," "asymmetry," and the sense that things are

not "just right." Clinical observations and research studies suggest that the distress associated with asymmetry can result from a fear of NJREs either (a) leading to negative events or (b) initiating an unending sense of incompleteness. Although these two manifestations of NJRE fears may seem similar at the surface level, the underlying overestimates of threat driving clinically significant distress are in fact distinct (e.g., Summerfeldt, 2004, 2008).

In the first form of this problem, the distress associated with NJREs precipitates from magical thinking that links the incompleteness–asymmetry with disastrous events that can only be prevented through ordering and arranging rituals. For example, "If the books are not arranged perfectly on the shelf, I will have bad luck." Fear-based interpretations that a NJRE portends an external disaster (e.g., accidents), however, is less common than the fear that if allowed to continue, the feelings of incompleteness, imbalance, and imperfection will persist indefinitely. Thus, the second form of NJRE-related distress is driven by dysfunctional beliefs that subjective feelings of incompleteness, imbalance, or incorrectness will increase to intolerable levels and cause some sort of internal harm (e.g., a physical or emotional "breakdown" or other loss of control). In other words, the person believes that he or she cannot cope with the emotional or physical discomfort engendered by NJREs (a phenomenon akin to difficulties tolerating distress, as described in detail in Chapter 6).

Whether NJREs are fueled by overestimates of external (e.g., bad luck) or internal (e.g., overwhelming distress) harm, these concerns are often accompanied by certain corrective actions. The restoration of order through rearranging (and similar behaviors) and the subsequent neutralization of discomfort function to negatively reinforce mistaken beliefs about the likelihood or severity of aversive outcomes related to NJREs, thus leading to the habitual use of ordering and other compulsive behaviors to reduce this sort of discomfort. Unfortunately, the reduction of distress associated with incompleteness (a) prevents the natural extinction of the distress (i.e., habituation) and (b) prevents the individual from learning that his or her estimates of NJRE-related threat are inaccurate.

CONCLUSION

The tendency to overestimate threat is among the key transdiagnostic cognitive processes that play a role in the maintenance of clinical anxiety. In this chapter, we defined the phenomenon and discussed its particular role in the persistence of inappropriate fear. We then considered the assessment of threat overestimation before turning to an overview of how this process manifests itself and can be addressed in clinical treatment across the diverse landscape of anxiety-related problems. The overestimation of threat may take a variety of forms, including the tendency to catastrophically miscalculate the probability of negative events, misjudge the presumed severity (or cost) of adverse outcomes, misinterpret the behavior of others as signs of negative evaluation,

and inflate the importance of unwanted thoughts. It also overlaps concep-
tually with the tendency to catastrophically misinterpret the meaning and
consequences of arousal-related body sensations (anxiety sensitivity; see Chap-
ter 4), as well as with catastrophic beliefs about the experience of uncertainty
(intolerance of uncertainty; Chapter 3), although research indicates that anxiety
sensitivity and intolerance of uncertainty contribute uniquely (beyond threat
overestimates) to the development and maintenance of clinical anxiety. As a
fundamental cognitive bias in clinical anxiety, a variety of clinical interven-
tions and treatment mechanisms explicitly or implicitly address overestimates
of threat, including exposure therapy focused on habituation (Chapter 14) or
inhibitory learning (Chapter 15), rational discussion to promote cognitive
change (Chapter 16), and interpretation bias modification (Chapter 20), as
discussed in Part II of this handbook.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental dis-
orders* (5th ed.). Washington, DC: Author.

Amir, N., Foa, E. B., & Coles, M. E. (1998). Negative interpretation bias in social phobia.
Behaviour Research and Therapy, *36*, 945–957. http://dx.doi.org/10.1016/S0005-
7967(98)00060-6

Arntz, A., Lavy, E., van den Berg, G., & van Rijsoort, S. (1993). Negative beliefs of spider
phobics: A psychometric evaluation of the Spider Phobia Beliefs Questionnaire.
Advances in Behaviour Research and Therapy, *15*, 257–277. http://dx.doi.org/10.1016/
0146-6402(93)90012-Q

Arntz, A., Rauner, M., & van den Hout, M. (1995). "If I feel anxious, there must be
danger": Ex-consequentia reasoning in inferring danger in anxiety disorders. *Behaviour
Research and Therapy*, *33*, 917–925. http://dx.doi.org/10.1016/0005-7967(95)00032-S

Barlow, D. H. (2004). *Anxiety and its disorders: The nature and treatment of anxiety and
panic*. New York, NY: Guilford Press.

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. Madison, CT: Inter-
national Universities Press.

Beck, A., Emery, G., & Greenberg, R. (2005). *Anxiety disorders and phobias: A cognitive
perspective* (15th ed.). Cambridge, MA: Basic Books.

Chambless, D. L., Caputo, G. C., Bright, P., & Gallagher, R. (1984). Assessment of fear
in agoraphobics: The Body Sensations Questionnaire and the Agoraphobic Cog-
nitions Questionnaire. *Journal of Consulting and Clinical Psychology*, *52*, 1090–1097.
http://dx.doi.org/10.1037/0022-006X.52.6.1090

Deacon, B., & Olatunji, B. O. (2007). Specificity of disgust sensitivity in the prediction
of behavioral avoidance in contamination fear. *Behaviour Research and Therapy*, *45*,
2110–2120. http://dx.doi.org/10.1016/j.brat.2007.03.008

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder.
Behaviour Research and Therapy, *38*, 319–345. http://dx.doi.org/10.1016/S0005-
7967(99)00123-0

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The post-
traumatic cognitions inventory (PTCI): Development and validation. *Psychological
Assessment*, *11*, 303–314. http://dx.doi.org/10.1037/1040-3590.11.3.303

Foa, E. B., Franklin, M. E., Perry, K. J., & Herbert, J. D. (1996). Cognitive biases in gen-
eralized social phobia. *Journal of Abnormal Psychology*, *105*, 433–439. http://dx.doi.org/
10.1037/0021-843X.105.3.433

Fredrikson, M., Annas, P., Fischer, H., & Wik, G. (1996). Gender and age differences in the prevalence of specific fears and phobias. *Behaviour Research and Therapy, 34,* 33–39. http://dx.doi.org/10.1016/0005-7967(95)00048-3

Mcnally, R. J., & Steketee, G. S. (1985). The etiology and maintenance of severe animal phobias. *Behaviour Research and Therapy, 23,* 431–435. http://dx.doi.org/10.1016/0005-7967(85)90171-8

Mineka, S., & Zinbarg, R. (2006). A contemporary learning theory perspective on the etiology of anxiety disorders: It's not what you thought it was. *American Psychologist, 61,* 10–26. http://dx.doi.org/10.1037/0003-066X.61.1.10

Obsessive Compulsive Cognitions Working Group. (2005). Psychometric validation of the obsessive belief questionnaire and interpretation of intrusions inventory— Part 2: Factor analyses and testing of a brief version. *Behaviour Research and Therapy, 43,* 1527–1542. http://dx.doi.org/10.1016/j.brat.2004.07.010

Ollendick, T. H., King, N. J., & Muris, P. (2002). Fears and phobias in children: Phenomenology, epidemiology, and aetiology. *Child and Adolescent Mental Health, 7,* 98–106. http://dx.doi.org/10.1111/1475-3588.00019

Öst, L.-G. (1992). Blood and injection phobia: Background and cognitive, physiological, and behavioral variables. *Journal of Abnormal Psychology, 101,* 68–74. http://dx.doi.org/10.1037/0021-843X.101.1.68

Rachman, S. (2004). Fear of contamination. *Behaviour Research and Therapy, 42,* 1227–1255. http://dx.doi.org/10.1016/j.brat.2003.10.009

Rachman, S. (2006). *The fear of contamination: Assessment and treatment.* New York, NY: Oxford University Press. http://dx.doi.org/10.1093/med:psych/9780199296934.001.0001

Rachman, S., & de Silva, P. (1978). Abnormal and normal obsessions. *Behaviour Research and Therapy, 16,* 233–248. http://dx.doi.org/10.1016/0005-7967(78)90022-0

Radomsky, A. S., Rachman, S., Thordarson, D. S., McIsaac, H. K., & Teachman, B. A. (2001). The Claustrophobia Questionnaire. *Journal of Anxiety Disorders, 15,* 287–297. http://dx.doi.org/10.1016/S0887-6185(01)00064-0

Rothbaum, B., Foa, E., Riggs, D., Murdock, T., & Walsh, W. (1992). A prospective examination of post-traumatic stress disorder in rape victims. *Journal of Traumatic Stress, 5,* 455–475. http://dx.doi.org/10.1002/jts.2490050309

Salkovskis, P. M. (1991). The importance of behaviour in the maintenance of anxiety and panic: A cognitive account. *Behavioural Psychotherapy, 19,* 6–19. http://dx.doi.org/10.1017/S0141347300011472

Salkovskis, P. M., Clark, D. M., Hackmann, A., Wells, A., & Gelder, M. G. (1999). An experimental investigation of the role of safety-seeking behaviours in the maintenance of panic disorder with agoraphobia. *Behaviour Research and Therapy, 37,* 559–574. http://dx.doi.org/10.1016/S0005-7967(98)00153-3

Salkovskis, P. M., & Harrison, J. (1984). Abnormal and normal obsessions—A replication. *Behaviour Research and Therapy, 22,* 549–552. http://dx.doi.org/10.1016/0005-7967(84)90057-3

Schmidt, N. B., Lerew, D. R., & Trakowski, J. H. (1997). Body vigilance in panic disorder: Evaluating attention to bodily perturbations. *Journal of Consulting and Clinical Psychology, 65,* 214–220. http://dx.doi.org/10.1037/0022-006X.65.2.214

Shafran, R., Thordarson, D., & Rachman, S. (1996). Thought-action fusion in obsessive compulsive disorder. *Journal of Anxiety Disorders, 10,* 379–391. http://dx.doi.org/10.1016/0887-6185(96)00018-7

Spangler, D. L., & Stice, E. (2001). Validation of the Beliefs About Appearance Scale. *Cognitive Therapy and Research, 25,* 813–827. http://dx.doi.org/10.1023/A:1012931709434

Steketee, G., & Obsessive Compulsive Cognitions Working Group. (2005). Psychometric validation of the obsessive belief questionnaire and interpretation of intrusions inventory—Part 2: Factor analyses and testing of a brief version. *Behaviour Research and Therapy, 43,* 1527–1542. http://dx.doi.org/10.1016/j.brat.2004.07.010

Stouthard, M. E. A., Mellenbergh, G. J., & Hoogstraten, J. (1993). Assessment of dental anxiety: A facet approach. *Anxiety, Stress, and Coping: An International Journal*, *6*, 89–105. http://dx.doi.org/10.1080/10615809308248372

Summerfeldt, L. J. (2004). Understanding and treating incompleteness in obsessive-compulsive disorder. *Journal of Clinical Psychology*, *60*, 1155–1168. http://dx.doi.org/10.1002/jclp.20080

Summerfeldt, L. J. (2008). Symmetry, incompleteness, and ordering. In J. Abramowitz, D. McKay, & S. Taylor (Eds.), *Clinical handbook of obsessive-compulsive disorder and related problems* (pp. 44–60). Baltimore, MD: Johns Hopkins University Press.

Taylor, S. (Ed.). (1999). *Anxiety sensitivity: Theory, research, and treatment of the fear of anxiety*. Mahwah, NJ: Erlbaum.

Taylor, S., & Cox, B. J. (1998). An expanded anxiety sensitivity index: Evidence for a hierarchic structure in a clinical sample. *Journal of Anxiety Disorders*, *12*, 463–483. http://dx.doi.org/10.1016/S0887-6185(98)00028-0

Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., . . . Cardenas, S. J. (2007). Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3. *Psychological Assessment*, *19*, 176–188. http://dx.doi.org/10.1037/1040-3590.19.2.176

World Health Organization. (1992). *International classification of diseases* (10th ed.). Geneva, Switzerland: Author.

2

Safety Behaviors

Michael J. Telch and Eric D. Zaizar

Marcus is a 32-year-old executive working for a major software company.[1] Anticipating having to stay up all night to complete a final report for an important patient, Marcus consumed three energy drinks over a span of 3 hours. All of a sudden, he noticed his heart pounding and racing and felt that he couldn't catch his breath. He called 911 in a state of panic, believing that he might be having a heart attack. When the paramedics arrived at his house, they questioned him and performed a standard EKG. The paramedics informed Marcus that he had experienced a panic attack but that his heart was fine and that there was no need to take him to the hospital.

Although reassured initially, over the next several weeks Marcus began to experience significant apprehension over the possibility that the paramedics had missed something and that his heart was not fine. He became more focused on his heart and started to take his pulse and blood pressure several times a day. At night, he found himself rehashing the precise words the paramedics used during their evaluation. Over that same period, he started to notice discomfort and tightness in his chest during the day and adopted the habit of keeping an aspirin in his shirt pocket at all times. Although Marcus was a regular exerciser, he started to avoid the gym for fear that the exertion may be too much for his heart to take. Likewise, he cut out his morning cup of coffee and even started to avoid chocolate for fear that the caffeine might trigger a cardiac event. While at work, he started to worry that the stress of his job might be harmful to his heart. He found himself shying away from bringing up areas of

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[1]All clinical case material has been altered to protect patient confidentiality.

concern or conflict with clients or coworkers. Despite these efforts, he noticed his anxiety escalating to the point where he had trouble concentrating at work and his interactions with his wife became consumed by talking about his physical and emotional symptoms. Even quality time with his two children took a back seat to his anxiety.

Marcus's case is fairly typical of someone who develops debilitating cardiac anxiety in response to a panic attack elicited by the threatening misinterpretation of a harmless and natural bodily reaction to stimulant ingestion. Note that although safety behaviors had nothing to do with his initial panic reaction, they played a significant role in fueling his anxiety and disability following the event. Note too that Marcus's use of safety behaviors started with checking his pulse and blood pressure but soon expanded to the avoidance of previously routine activities such as exercise, drinking coffee, consuming chocolate, and other safety behaviors like avoiding stressful encounters at work, carrying aspirin in his shirt pocket, and mentally rehearsing what the paramedics told him after his panic attack. Marcus's case also illustrates the close connection between the underlying perceived threat (heart problem) and the kinds of safety behaviors he adopted in an attempt to cope with it.

The anxiety disorder literature offers several definitions of safety behaviors. In his seminal paper, Salkovskis (1991) defined *safety behaviors* as overt or covert avoidance of feared outcomes that are carried out within a specific situation. This definition has several limitations. First, it does not distinguish between safety behaviors that are adaptive, such as the wearing of seat belts, and those that maintain or even exacerbate anxiety disorder symptoms, such as the repeated checking of one's pulse when anxious. Second, it does not capture a central feature of the safety behaviors observed in anxiety patients—namely, the erroneous or exaggerated nature of the threats driving the urge to engage in unnecessary protective actions.

In their review of anxiety-related safety behaviors, Helbig-Lang and Petermann (2010) defined *safety behaviors* as dysfunctional emotion regulation strategies. Borrowing from the early observations of anxiety-maintaining behaviors in obsessive-compulsive disorder (OCD; Rachman & Hodgson, 1980), dysfunctional emotion regulation strategies were categorized as either serving a preventive function (i.e., preventing future anxiety increases) or a restorative function (i.e., impeding anxiety in a feared situation). Defining safety behaviors as dysfunctional emotion regulation strategies is also problematic insofar as it implies that the motivation to perform safety behaviors is always to reduce or prevent anxiety. Although this is often the case, many patients perform safety behaviors to prevent, escape from, or lessen the severity of perceived threats other than anxiety. Examples include the person with claustrophobia who avoids elevators out of concern that they will be trapped or the individual with health anxiety who avoids caffeine in order to avoid a

fatal cardiac event. In an attempt to address these limitations, we defined *anxiety-related safety behaviors* as unnecessary actions taken to prevent, escape from, or reduce the severity of a perceived threat (Telch & Lancaster, 2012).

CONCEPTUAL IMPLICATIONS

Human beings are hardwired to engage in protective actions when faced with perceived threats. Examples of such actions include wearing seat belts to improve one's chances of surviving a car crash, wearing warm clothing when venturing outside on a winter's day in North Dakota to avoid hyperthermia, or using condoms when having sex with a new partner to prevent contracting a sexually transmitted disease. Engaging in such protective actions when no real threats exist, however, has been shown to actually fuel clinical anxiety and may even play a role in the maintenance of other problems such as insomnia and chronic pain.

Over the past several decades there has been a burgeoning of research in the anxiety literature on safety behaviors. This research has tackled important questions relevant to (a) the phenomenology of safety behaviors across various anxiety-related presentations, (b) the role of safety behaviors in the development or exacerbation of pathological fear, (c) the impact of safety behaviors during fear extinction on threat expectancies and return of fear in healthy controls, (d) the effects of making safety behaviors available during exposure therapy in anxious populations, and (e) the effects of fading safety behaviors during exposure therapy. Comprehensive reviews of this literature are available (see Blakey & Abramowitz, 2016; Goetz, Davine, Siwiec, & Lee, 2016; Helbig-Lang & Petermann, 2010; Meulders, Van Daele, Volders, & Vlaeyen, 2016; Telch & Lancaster, 2012). The following subsections address those issues and questions in turn.

Phenomenology of Safety Behaviors Observed in Anxiety Patients

Although safety behaviors are ubiquitous across the full range of anxiety disorders, patients' specific profile of safety behaviors has been shown to be conceptually linked to the patients' specific threat perceptions (Salkovskis, 1991). Examples of this threat–safety behavior linkage include the cardiac anxiety patient who feels compelled to check his pulse and avoid exercise, caffeine, or stressful encounters for fear of having a heart attack; the socially anxious student who avoids raising his hand in class for fear of being perceived as stupid; or the person with a roach phobia who feels compelled to visually scan the floor of each room before entering. Table 2.1 illustrates some of the common threats observed in various anxiety syndromes and their corresponding safety behaviors.

Factor analytic techniques have also been used to categorize safety behaviors for certain anxiety populations. For example, Kamphuis and Telch (1998) factor

TABLE 2.1. Examples of Safety Behaviors and Associated Threats Across Anxiety-Related Disorders

DSM–5 disorder	Perceived threats	Safety behaviors
Panic disorder	Concern about dying from cardiac arrest because of a panic attack	Eliminating all caffeine intake Carrying an anxiolytic "rescue" medication at all times
Agoraphobia	Concern about embarrassing oneself if a panic attack occurs in a public place	Avoiding leaving the house as much as possible When leaving the house, taking a companion who could help in case of a panic attack
Social anxiety disorder	Concern that other people at a party will be likely to notice signs of anxiety and will be judgmental of it	Going to the bathroom regularly to check for excessive sweating or blushing Mentally reviewing the conversation afterwards to make sure there were no signs of nervousness
Generalized anxiety disorder	Concern about being fired from a stable job	Checking with boss regularly to receive reassurance about adequate job performance Continuous research on other job opportunities to prepare back-up options
Specific phobia (animal)	Concern about being attacked by an unprovoked dog while on a walk in the neighborhood	Avoiding certain streets where dog owners live Carrying a large stick to use as protection if attacked
Obsessive-compulsive disorder	Concern about contracting a fatal illness when eating at a restaurant	Using a paper towel to open doors Cleaning with hand sanitizer after touching tables, chairs, and menus
Posttraumatic stress disorder	Concern about being assaulted when going shopping	Carrying pepper spray at all times Avoiding going out alone
Illness anxiety disorder	Concern about high probability of getting skin cancer	Checking changes in moles by taking pictures every week Extensively researching signs

Note. DSM–5 = Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (American Psychiatric Association, 2013).

analyzed safety behavior data from 105 panic disorder and agoraphobia patients based on their responses on the Texas Safety Maneuver Scale (Kamphuis & Telch, 1998). Five interpretable factors emerged: (a) classic agoraphobic avoidance (e.g., avoidance of crowded stores and public transportation), (b) use of relaxation techniques to relieve anxiety, (c) avoidance of stressful encounters, (d) avoidance of somatic perturbations (e.g., avoidance of caffeine or vigorous exercise), and (e) use of distraction techniques.

More recent factor analytic work examining global patterns of safety behaviors in social anxiety revealed two primary safety behavior categories: avoidance and impression management. These same two factors also emerged in a second study investigating situational use of safety behaviors during a controlled social interaction in a meeting of a large sample of participants with generalized social anxiety disorder (Plasencia, Alden, & Taylor, 2011). Interestingly, the two safety behavior subtypes were associated with different social outcomes. Avoidance was associated with higher state anxiety during the interaction and negative reactions from participants' interaction partners, whereas impression-management strategies hindered corrections in negative appraisals of subsequent interactions (Plasencia et al., 2011).

Preventive Versus Restorative Safety Behaviors

In their review of safety behaviors and anxiety, Helbig-Lang and Petermann (2010) proposed a taxonomy for conceptualizing safety behaviors along two primary dimensions strategy and function, with each dimension having two levels: for strategy, behavioral strategies and cognitive strategies; for function, preventive function and restorative function. Much attention has recently been given to the restorative versus preventive distinction and for good reason (see Goetz et al., 2016). *Preventive safety behaviors* are those that reduce the strength or intensity of contact with a core threat in the immediate threat-provoking context. Examples for fear of flying include carrying rescue medication on the plane, repeated checking of the weather on one's phone, and scanning the passengers for potential terrorists. In contrast, *restorative safety behaviors* are those that remedy a situation back to a desired state following confrontation with a perceived threat. Sticking with the fear of flying example, having a stiff drink *after* the plane lands or calling home to let your family members know you arrived safely would be examples of restorative safety behaviors given that the function of the action is to return one to a state of perceived safety.

Role of Safety Behaviors in the Development or Escalation of Anxiety

Several studies have provided support for the anxiogenic effects of safety behaviors on the development and/or exacerbation of anxiety. In a clever field study, Deacon and Maack (2008) used an A-B-A within-subjects design (1 week baseline [A], 1 week of prescribed contamination-related safety behaviors [B], and 1 week return to baseline [A]) to investigate the effects of safety behaviors on contamination fear among undergraduate students scoring either low or high in contamination fear. Following the safety behavior manipulation, participants in both the high and low contamination fear groups showed statistically significant increases in threat overestimation, contamination fear, and heightened emotional and behavioral responding to three contamination-related behavioral avoidance tasks. However, the absence of a control group precludes strong causal inferences that the performance of safety behaviors was responsible for the observed increases in contamination fear.

This limitation was addressed in a follow-up experiment (Olatunji, Etzel, Tomarken, Ciesielski, & Deacon, 2011) in which undergraduates were randomized to either monitor or monitor and perform a series of health-related safety behaviors (e.g., checking body temperature, checking lymph nodes by palpitation, and monitoring pulse rate). After 3 weeks, those assigned to the safety behavior condition (relative to those in the monitoring-only control group) displayed significantly higher health anxiety, lower behavioral approach scores, and heightened perceived risk ratings of contracting a cold, the flu, or mononucleosis. Although these findings provide the first experimental data suggesting that safety behaviors play a causal role in health anxiety development, participants' daily monitoring of safety behaviors cannot be ruled out as an alternative explanation for the observed increases in health-related anxiety.

In a similar experiment investigating checking behavior and obsession-related cognitions, van Uijen and Toffolo (2015) added a no-instruction control group. Participants were randomized to one of three groups: (a) engage in increased checking behavior for one week, (b) monitor checking behavior without altering it, or (c) no instruction. Consistent with prediction, increases in checking-related threat appraisals were observed in the experimental group but not in the monitoring or no-instruction groups. These findings suggest that it is the increased use of safety behaviors as opposed to the mere self-monitoring of them that is responsible for the pathogenic effects on subsequent threat appraisals.

Impact of Safety Behaviors During Extinction of Conditioned Fear

Based on work in rodents (Rescorla, 2003) suggesting that fear extinction can be impeded by the presentation of a concurrent conditioned stimulus (safety cue) signaling the absence of the unconditioned stimulus (shock), Lovibond and colleagues (Lovibond, Mitchell, Minard, Brady, & Menzies, 2009) conducted a clever experiment in which 65 undergraduates were taken through a Pavlovian shock acquisition phase in which students learned that two colored squares (A and C) were followed by a shock whereas another (B) was not. In Phase 2 (avoidance acquisition phase), students were trained in the presence of stimulus A to press a button that prevented the shock. Next, half the students (experimental group) underwent extinction with the avoidance response available, whereas for the other half (control group), the avoidance response was unavailable. In the final critical test phase, both the experimental and control groups were exposed to the conditioned stimulus without the avoidance response available. Consistent with the researchers' prediction, students in the control condition showed normal extinction to stimulus C, whereas those who underwent extinction with a voluntary safety behavior showed significantly less extinction or "protection from extinction" as indexed by shock expectancy ratings and physiological arousal. This "protection from extinction" effect has been replicated in two independent experiments using a voluntary joystick movement shock conditioning paradigm (Volders, Meulders, De Peuter, Vervliet, &

Vlaeyen, 2012). Relatedly, Engelhard, van Uijen, van Seters, and Velu (2015) showed that participants who performed a safety behavior to a stimulus that was never directly paired with shock displayed an increased threat appraisal (expectancy of shock) to that stimulus at a later test phase relative to controls who were not able to use safety behaviors. This important finding suggests that safety behaviors increase threat appraisal through indirect means. Moreover, consistent with behavioral observations of individuals treated for anxiety disorders, evidence from human fear conditioning studies also suggests that safety behaviors persist even after fear has extinguished and that when present, safety behaviors increase threat appraisal (shock expectancy), especially among individuals with high trait anxiety (Vervliet & Indekeu, 2015).

WHAT MIGHT EXPLAIN THE ANXIOGENIC EFFECTS OF SAFETY BEHAVIORS?

Numerous theories have been put forth to explain the anxiogenic effects of safety behaviors and how safety behaviors may impede exposure-based therapies; space limitations permit only a brief description of these theories below. For an excellent review of these theories and their supporting evidence, see Blakey and Abramowitz (2016).

Misattribution of Safety Hypothesis

Salkovskis (1991) suggested that when engaging in safety behaviors while confronting a fear-provoking target, the anxious person misattributes one's safety (i.e., threat nonoccurrence) to the safety behavior, thus leaving intact one's faulty threat perception related to the feared target (e.g., "thank goodness I sat down when my heart started pounding, or else it would have escalated to a heart attack"). Evidence in support of this theory comes from correlational studies showing that panic patients who attribute their therapeutic gains to their medication have poorer outcomes than those who attribute their gains to their own efforts (Başoğlu et al., 1994; Biondi & Picardi, 2003). Surprisingly, few experimental tests of the misattribution hypothesis have appeared. We experimentally manipulated claustrophobic subjects' postexposure expectancy of a presumed memory pill they had ingested prior to exposure therapy (Powers, Smits, Whitley, Bystritsky, & Telch, 2008). Consistent with the misattribution of safety hypothesis, those told that the pill they ingested was an herbal tranquilizer showed poorer outcomes at follow-up relative to those in a group who were told they had ingested an herbal stimulant.

Attentional Resources Hypothesis

Some have suggested that safety behaviors maintain pathological fear by interfering with the processing of threat disconfirmation through a redirection of attentional resources to the presence of safety cues and the execution of

safety behaviors (Sloan & Telch, 2002; Telch & Lancaster, 2012). In support of this formulation, Telch and colleagues (Kamphuis & Telch, 2000; Telch et al., 2004) found that adding a heavy cognitive load task during exposure therapy for claustrophobia reduces treatment efficacy. In contrast, experimental manipulations designed to explicitly increase attention to threat-disconfirming information have been shown to enhance exposure treatment outcomes (Kamphuis & Telch, 2000; Sloan & Telch, 2002; Telch, Valentiner, Ilai, Petruzzi, & Hehmsoth, 2000). Additional support for this hypothesis comes from a social anxiety treatment study showing that safety behaviors mediated the negative effects of self-focused attention on treatment outcome regardless of treatment modality (i.e., cognitive behavior group treatment vs. mindfulness and acceptance-based treatment; Desnoyers, Kocovski, Fleming, & Antony, 2017).

Threat Transmission Hypothesis

It has also been suggested that the mere engagement in protective actions transmits threat signaling through lower level, limbic-type activation (Telch & Lancaster, 2012). Consistent with this idea, Niedenthal (2007) introduced the theory of embodied emotion, suggesting that physical enactments consistent with a given emotion action tendency (e.g., flight) lead to increased activation of the target emotion (e.g., fear). Data supporting the threat transmission model come from studies reviewed earlier demonstrating that having non-anxious populations engage in unnecessary protective actions is anxiogenic (Deacon & Maack, 2008; Olatunji et al., 2011) as well as the human Pavlovian fear conditioning studies suggesting that the mere availability of safety cues interfere with fear extinction by increasing threat appraisals (Engelhard et al., 2015; Lovibond et al., 2009; Volders et al., 2012).

Threat Disconfirmation Attenuation Hypothesis: A Unifying Theory

A common assumption of the theories described above is that safety behaviors interfere with the emotional processing of threat disconfirming information, a central putative change mechanism for fear attenuation (Foa & Kozak, 1986). Consequently, it is reasonable to assume that under some conditions, misattribution effects, attentional resource allocation effects, and direct threat transmission effects may all be operating in combination to account for the pathogenic effects of safety behaviors on the development and maintenance of pathological fear expression.

ASSESSMENT OF SAFETY BEHAVIORS

Prior to performing a formal assessment of patients' safety behaviors, we typically provide education about safety behaviors in the larger context of educating patients about the nature and treatment of anxiety. Providing patients with education about safety behaviors and their anxiety maintaining effects is

an important first step in the assessment process. Didactic instruction and instructional handouts are used to educate the patient with respect to (a) the nature and types of safety behaviors displayed, (b) how safety behaviors become strengthened, and (c) how safety behaviors may serve to maintain or even worsen anxiety symptoms.[2] We have found that using the phrase *unnecessary protective actions* interchangeably with safety behaviors can sometimes be helpful for patients who are having trouble grasping the concept of anxiety-promoting safety behaviors.

Four primary sources of data can be helpful in constructing an accurate formulation of the patient's safety behavior profile: (a) data from interviews with the patient and significant others, (b) data from psychometric scales, (c) data collected during direct in vivo observation of the patient in the office or the field, and (d) data collected by the patient using daily self-monitoring forms.

Clinical Interview With Patient and Significant Others

Given that safety behaviors are threat driven (Salkovskis, 1991; Salkovskis, Clark, & Gelder, 1996), a thorough case formulation of the patient's internal and external threats provide vital information for identifying patients' safety behaviors. It is also important to confirm that the protective actions described by the patient are actually serving a perceived safety function. This can often be accomplished by probing whether patients would experience greater anxiety if they were prevented from performing the safety behavior in question. It should be noted that patients differ markedly with respect to insight about their safety behaviors. For some, a safety behavior may become so automatic that they do not recognize that their actions are serving a safety function.

When possible, it is useful to interview one or more family members as a means of forming a more complete picture of the patient's safety behaviors. Moreover, family members often unwittingly become involved in assisting the patient in performing safety behaviors (i.e., "accommodation," as discussed in Chapter 13) and are often under the misguided impression that they are helping the patient in doing so. For example, seeking reassurance from family members is a frequently observed safety behavior observed in both children and adults with various anxiety presentations such as health anxiety, generalized anxiety disorder, and separation anxiety. In patients with OCD or panic disorder, family members are often asked to perform multiple safety behaviors ranging from helping an OCD patient perform cleaning rituals to driving the panic patient to the emergency room during a panic attack.

Mental safety behaviors also pose a challenge to the clinician. Interview probes such as "Are there any intentional mental activities you perform to cope with your anxiety or prevent something bad from happening?" can be helpful when assessing covert threat neutralizing or anxiety reduction

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[2]Patient handout is available upon request from Michael J. Telch.

strategies. Examples of mental safety behaviors include repetitive mental checking, reviewing, or analyzing past events or conversations with others.

Self-Report Safety Behavior Scales

Administering one or more self-report scales specifically developed for assessing anxiety-related safety behaviors is a cost-effective strategy for identifying and quantifying patients' safety behaviors. They also have the advantage of easy readministration during treatment to evaluate whether treatment is leading to reduced safety behavior utilization. Table 2.2 provides examples of established scales used to assess safety behaviors across various anxiety domains.

Direct In Vivo Observation of the Patient in the Office or in the Field

Direct observation of the patient's behavior during an anxiety challenge can be quite helpful in identifying patient's safety behaviors. For example, the driving phobia patient may tightly grip the steering wheel, drive under the speed limit, use unnecessary breaking, avoid driving in the left-hand lane, or pull over to the side of the road when anxious. In contrast, the socially anxious patient may use a variety of impression management safety behaviors such as avoiding clothing

TABLE 2.2. Self-Report Assessment Measures of Safety Behaviors Across Anxiety-Related Disorders

Disorder and measure name	Source
Panic disorder–agoraphobia	
Texas Safety Maneuver Scale	Kamphuis and Telch (1998)
Social anxiety disorder	
Social Behavior Questionnaire	Clark et al. (1995)
Presentation-Related Safety Behaviors Scale	Kim (1999)
Social Phobia Safety Behaviors Scale	Pinto-Gouveia, Cunha, and do Céu Salvador (2003)
Subtle Avoidance Frequency Examination	Cuming et al. (2009)
Posttraumatic stress disorder	
Safety Behaviors Questionnaire	Dunmore, Clark, and Ehlers (2001); Ehring, Ehlers, and Glucksman (2008)[a]
Generalized anxiety disorder	
The Worry Behaviors Inventory	Mahoney et al. (2016)
Health anxiety	
Questionnaire for Assessing Safety Behavior in Hypochondriasis/Health Anxiety	Weck, Brehm, and Schermelleh-Engel (2012)
Safety Behavior Checklist	Olatunji, Etzel, Tomarken, Ciesielski, and Deacon (2011)[b]
Obsessive-compulsive disorder	
Safety Behavior Checklist	Deacon and Maack (2008)[b]

Note. [a]Measure developed over a series of studies. [b]Useful checklist from an experimental study that has not yet been experimentally validated.

that might show perspiration (or wearing excessive clothing to conceal perspiration) as well as mentally rehearsing possible topics or questions to talk about with others to avoid appearing incompetent. Although less cost-effective, direct behavioral observation of patients' safety behavior engagement provides a high-fidelity assessment strategy for assessing observable safety behaviors.

Individually Tailored Patient Self-Monitoring Forms

Having patients complete daily self-monitoring forms of their safety behaviors can be a useful assessment strategy with several added benefits over the assessment approaches discussed above. The assessment form itself can be individually tailored for each patient's safety behavior profile. Online survey platforms such as Survey Monkey provide convenient tools for designing self-monitoring forms and data summary tools for the clinician and patient to review progress and examine relationships between safety behaviors and anxiety symptoms. Moreover, daily self-monitoring can be used to support patients' efforts in safety behavior fading by providing more fine-grained data to identify potential obstacles to target in session. For example, we often have patients rate their self-efficacy to resist performing the safety behavior along with their anticipated threat(s) if they were *not* to perform the safety behavior.

CLINICAL IMPLICATIONS

In the following sections, we provide brief descriptions of commonly observed safety behaviors for various anxiety disorder profiles.

Fear of Fear

Individuals presenting with a heightened "fear of fear" (often referred to as *anxiety sensitivity*; see Chapter 4) display a heightened sense of threat in response to the experience of stress, anxiety, or panic. Evidence suggests that the specific threat forecasts governing the fear of panic tend to fall into one of three panic appraisal dimensions: (a) physical threats (e.g., heart attack, suffocation, fainting); (b) social threats (e.g., making a scene in front of others, embarrassing family or friends); and (c) threats focused on loss of control/mental illness (e.g., "I will lose control during a panic attack and jump out a window," or "I will become mentally disabled"; Telch, Brouillard, Telch, Agras, & Taylor, 1989). The safety behaviors typical of individuals presenting with panic disorder and agoraphobia are illustrated in the case example provided in the opening of the chapter.

Fear of Negative Evaluation

Individuals with social anxiety disorder carry out a variety of behaviors to avoid or attenuate the perceived risk of negative evaluation. The specific

threat forecasts in socially anxious individuals varies considerably and may include one or more of the following: appearing weird, stupid, incompetent, or overly anxious. The socially anxious person may not only engage in safety behaviors during social situations but also before or after a social encounter. As noted earlier, the specific configuration of concerns dictates the safety behaviors that the person is likely to display. For example, a socially anxious college student who believes he may appear incompetent will mentally rehearse what to say before entering a classroom in anticipation of being called upon by the professor. Once in the classroom, he will likely avoid raising his hand to express his opinion. If asked a question, he may pause for extended periods of time and think very carefully about what to say before uttering a single word.

Socially anxious people often display an exaggerated concern that others will notice their anxiety and judge them unfavorably because of it. Typical safety behaviors associated with this threat include actions such as going to the bathroom to check if one's face is flushed, excessively applying deodorant to reduce sweat accumulation, writing a check to a grocery store in advance to avoid the threat of displaying trembling hands at the register, or pretending to talk on one's cell phone at parties. Following a social interaction, individuals preoccupied with hiding their anxiety may mentally review and overly analyze the interaction out of concern that they may have appeared anxious.

Fear of Contamination

Anxiety and avoidance behavior related to contamination concerns is a frequent clinical presentation seen in individuals with OCD. Individuals with unrealistic contamination concerns engage in a host of behaviors to both prevent being contaminated and to restore cleanliness after coming into contact with a perceived contaminant. A few classic examples of preventive safety behaviors linked to a fear of contracting a fatal illness are avoiding touching public door handles (especially restroom door handles), money, elevator buttons, animals, and railing in public stairwells. Persons with these concerns may also rely on tissues or gloves to distance themselves from contacting perceived contaminants with their bare skin if contact is unavoidable. If these individuals do come into contact with a perceived contaminant such as raw meat or equipment at the gym, they will likely attempt to restore cleanliness through excessive handwashing or applying antibacterial hand sanitizer. Indeed, carrying hand sanitizer on one's person or having it readily available in one's car is a common safety behavior motivated by contamination fears. If a method for restoring sanitation is not readily available, patients with these concerns will surely avoid touching their face and mouth to prevent pathogens from entering their body.

Not all contamination concerns are bacterial, viral, or parasitic. In some instances, patients may fear chemical contamination. For example, an

individual who believes that the chemicals used to clean her bathroom floor could burn her skin or render her permanently blind may avoid leaving a bar of soap on the shower floor because of the possibility that the dangerous chemicals will seep into the soap and cause harm. Repeatedly checking labels on bottles and tubes of toothpaste to prevent the accidental ingestion of harmful chemicals is also common.

Some individuals with contamination-related OCD show an interesting clinical presentation in which the person perceives that (s)he is internally contaminated, a phenomenon Rachman (1994) referred to as *mental pollution*, which he defined as a "sense of internal un-cleanness, which can and usually does arise and persist regardless of the presence or absence of external, observable dirt" (p. 1). Individuals with this presentation are not concerned with objective germs but rather may experience significant washing or cleaning urges in response to immoral or blasphemous thoughts. Although some might wash to reinstate a sense of internal cleanliness, the types of safety behaviors performed in response to mental pollution also differ from more traditional contamination concerns in part because the emotion of guilt and disgust are predominant. For instance, individuals with mental pollution often attempt to avoid certain repugnant or immoral thoughts, as well as avoid external cues such as seedy parts of town or people who they perceive as morally defective.

Fear of Unacceptable Thoughts

Patients with OCD often endorse concerns related to thoughts or images they deem unacceptable. Furthermore, these individuals go to great lengths to attempt to "undo" or neutralize a repugnant obsession by adopting idiosyncratic mental maneuvers. It is important to understand that covert mental compulsions are functionally equivalent to the more obvious overt rituals. As an example, take the case of a religious individual who experiences obsessions about having sex with Jesus. This person is likely to attempt to suppress or discharge this image from his or her mind. Another mental maneuver that might be adopted is excessively praying for forgiveness for having experienced the obsession. Additionally, the individual may try to cancel out or replace the intrusive sexual image by thinking "good" thoughts (e.g., "Praise the Lord") or conjuring opposite images (e.g., Jesus smiling). Mental distraction such as counting until the image dissipates is another common mental safety behavior observed in patients with these concerns. Although some OCD patients may primarily engage in mental compulsions, the use of mental compulsions does not preclude the deployment of overt safety behaviors as well. For example, the individual previously described may repeatedly confess to a priest that he or she had the grotesque image and ask for advice or seek reassurance from others such as asking friends whether they have ever had similar images come to mind. These examples highlight the ample diversity in safety behaviors used by individuals with these concerns.

Fear of Traumatic Memories

Individuals presenting with posttraumatic stress disorder (PTSD) display exaggerated threat perception in connection with memories of a previous traumatic event. Although the traumatic event itself was objectively dangerous at the time, memories of these events are not. Avoidance and other unnecessary protective actions following the traumatic event may play a causal role in the development of PTSD in response to a traumatic event as well as maintain or exacerbate existing PTSD symptoms. Female sexual assault victims may avoid certain activities or situations that trigger memories of the traumatic event (e.g., avoiding nightclubs). They may also engage in more subtle avoidance maneuvers such as refraining from wearing low-cut blouses and excessive checking of window and door locks. Victims of serious motor vehicle accidents may avoid driving altogether or engage in more restricted avoidance such as avoiding driving in the rain, breaking while driving, or avoiding the intersection where the crash occurred. Combat veterans presenting with PTSD often display excessive visual scanning of their environment, avoidance of sitting with their back exposed to others, and avoidance of barbecues because they trigger memories of burning flesh. Regardless of the type of traumatic event, PTSD sufferers often use mental maneuvers such as distraction or intentional thought suppression in an effort to avoid thinking about the traumatic event.

Circumscribed Fears (Specific Phobias)

Four specific categories of specific phobias and one residual category are recognized in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013). These include (a) *animal* (e.g., snakes, spiders, dogs), (b) *natural environment* (e.g., heights, storms, water), (c) *blood-injection injury* (e.g., hospitals, needles, blood draws), (d) *situational* (e.g., airplanes, elevators, enclosed places), and (e) *other* (e.g., choking or vomiting, loud sounds, clowns). Each specific fear is associated with specific perceived threats; for example, height phobia, falling; claustrophobia, entrapment or suffocation; dog phobia, being attacked; blood injury, fainting; and airplanes, crashing. Of the various safety behaviors observed in specific phobias, none is more pervasive and pathogenic than avoidance of the feared object or situation. In addition to avoidance, other safety behaviors commonly observed in specific phobias include (a) visual scanning of the environment (e.g., checking for roaches, dogs, smoke coming from the jet engine, weather); (b) use of protective aids (e.g., one of our spider phobia patients would put aluminum foil over the openings of his boots to prevent spiders from crawling inside); (c) reassurance seeking from others (e.g., asking the flight attendant whether the plane has sufficient fuel to make the flight); (d) physical maneuvers (e.g., tightly gripping one's steering wheel while driving); (e) ingesting or carrying tranquilizers, alcohol, or other relaxing

herbs when confronting a phobic target (e.g., magnetic resonance imaging scan for a person with claustrophobia); (f) mental acts (e.g., praying while on the ski resort chairlift); and (g) subtle forms of avoidance (e.g., avoiding the left lanes on the freeway). These are just a small representation of the diverse safety behaviors that are commonly observed among those presenting with specific phobias.

Pathological Worrying (Generalized Anxiety Disorder)

Although worrying serves an adaptive function in response to real threat or danger, individuals with generalized anxiety disorder engage in unnecessary pathological worry. Some might even construe worrying itself as a form of safety behavior. Like other anxiety-related problems, those presenting with generalized anxiety disorder display exaggerated threat perceptions related to one or more life spheres such as relationships, work, family, and health. Often these individuals partake in a host of maladaptive safety behaviors in an effort to avert or attenuate threatening outcomes in one or more of these life spheres. Examples include the husband who worries that his wife no longer loves him and begins to engage in excessive questioning (e.g., "Honey, do you still love me?"). That same husband may begin to check her email or cell phone for signs that she has taken on a lover. Other examples include the administrative assistant who copes with her worry that her supervisor is unhappy with her work by engaging in repeated time-consuming checking of each email or memo before sending it, for fear that one mistake may lead to her termination.

CONCLUSION

Anxiety-related safety behaviors are unnecessary actions taken to prevent, escape from, or reduce the severity of a perceived threat (Telch & Lancaster, 2012). In this chapter, we discussed the critical role safety behaviors play in the emergence, maintenance, and escalation of all forms of anxiety-related pathology. Furthermore, we have provided a brief overview of the various theories that aim to explain the anxiogenic effects of safety behaviors with a special emphasis on threat disconfirmation attenuation as a unifying element across theories. Clinicians will likely find our chapter particularly useful for getting a sense of the multiplicity of unnecessary protective actions that anxious patients use. Additionally, we hope this chapter clearly depicts how different safety behaviors map onto specific perceived threats. We highly encourage clinicians to use our section on safety behavior assessment as guidance for implementing more targeted interventions. Irrespective of their specific diagnosis, a patient's idiosyncratic safety behaviors must be accurately assessed and then eliminated to maximize treatment of clinical anxiety.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.

Başoğlu, M., Marks, I. M., Kiliç, C., Swinson, R. P., Noshirvani, H., Kuch, K., . . . Brewin, C. R. (1994). Alprazolam and exposure for panic disorder with agoraphobia: Attribution of improvement to medication predicts subsequent relapse. *The British Journal of Psychiatry*, *164*, 652–659. http://dx.doi.org/10.1192/bjp.164.5.652

Biondi, M., & Picardi, A. (2003). Attribution of improvement to medication and increased risk of relapse of panic disorder with agoraphobia. *Psychotherapy and Psychosomatics*, *72*(2), 110–111. http://dx.doi.org/10.1159/000068687

Blakey, S. M., & Abramowitz, J. S. (2016). The effects of safety behaviors during exposure therapy for anxiety: Critical analysis from an inhibitory learning perspective. *Clinical Psychology Review*, *49*, 1–15. http://dx.doi.org/10.1016/j.cpr.2016.07.002

Clark, D. M., Butler, G., Fennell, M., Hackmann, A., McManus, F., & Wells, A. (1995). *Social Behaviour Questionnaire*. Unpublished manuscript.

Cuming, S., Rapee, R. M., Kemp, N., Abbott, M. J., Peters, L., & Gaston, J. E. (2009). A self-report measure of subtle avoidance and safety behaviors relevant to social anxiety: Development and psychometric properties. *Journal of Anxiety Disorders*, *23*, 879–883. http://dx.doi.org/10.1016/j.janxdis.2009.05.002

Deacon, B., & Maack, D. J. (2008). The effects of safety behaviors on the fear of contamination: An experimental investigation. *Behaviour Research and Therapy*, *46*, 537–547. http://dx.doi.org/10.1016/j.brat.2008.01.010

Desnoyers, A. J., Kocovski, N. L., Fleming, J. E., & Antony, M. M. (2017). Self-focused attention and safety behaviors across group therapies for social anxiety disorder. *Anxiety, Stress, and Coping: An International Journal*, *30*, 441–455. http://dx.doi.org/10.1080/10615806.2016.1239083

Dunmore, E., Clark, D. M., & Ehlers, A. (2001). A prospective investigation of the role of cognitive factors in persistent posttraumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy*, *39*, 1063–1084. http://dx.doi.org/10.1016/S0005-7967(00)00088-7

Ehring, T., Ehlers, A., & Glucksman, E. (2008). Do cognitive models help in predicting the severity of posttraumatic stress disorder, phobia, and depression after motor vehicle accidents? A prospective longitudinal study. *Journal of Consulting and Clinical Psychology*, *76*, 219–230. http://dx.doi.org/10.1037/0022-006X.76.2.219

Engelhard, I. M., van Uijen, S. L., van Seters, N., & Velu, N. (2015). The effects of safety behavior directed towards a safety cue on perceptions of threat. *Behavior Therapy*, *46*, 604–610. http://dx.doi.org/10.1016/j.beth.2014.12.006

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin*, *99*, 20–35. http://dx.doi.org/10.1037/0033-2909.99.1.20

Goetz, A. R., Davine, T. P., Siwiec, S. G., & Lee, H. J. (2016). The functional value of preventive and restorative safety behaviors: A systematic review of the literature. *Clinical Psychology Review*, *44*, 112–124. http://dx.doi.org/10.1016/j.cpr.2015.12.005

Helbig-Lang, S., & Petermann, F. (2010). Tolerate or eliminate? A systematic review on the effects of safety behavior across anxiety disorders. *Clinical Psychology: Science and Practice*, *17*, 218–233. http://dx.doi.org/10.1111/j.1468-2850.2010.01213.x

Kamphuis, J. H., & Telch, M. J. (1998). Assessment of strategies to manage or avoid perceived threats among panic disorder patients: The Texas Safety Maneuver Scale (TSMS). *Clinical Psychology & Psychotherapy*, *5*, 177–186. http://dx.doi.org/10.1002/(SICI)1099-0879(199809)5:3<177::AID-CPP166>3.0.CO;2-%23

Kamphuis, J. H., & Telch, M. J. (2000). Effects of distraction and guided threat reappraisal on fear reduction during exposure-based treatments for specific fears. *Behaviour Research and Therapy*, *38*, 1163–1181. http://dx.doi.org/10.1016/S0005-7967(99)00147-3

Kim, E. J. (1999). *Social self-processing and safety behaviors in social phobics* (Unpublished doctoral dissertation). Seoul National University, Seoul, South Korea.

Lovibond, P. F., Mitchell, C. J., Minard, E., Brady, A., & Menzies, R. G. (2009). Safety behaviours preserve threat beliefs: Protection from extinction of human fear conditioning by an avoidance response. *Behaviour Research and Therapy*, 47, 716–720. http://dx.doi.org/10.1016/j.brat.2009.04.013

Mahoney, A. E. J., Hobbs, M. J., Newby, J. M., Williams, A. D., Sunderland, M., & Andrews, G. (2016). The Worry Behaviors Inventory: Assessing the behavioral avoidance associated with generalized anxiety disorder. *Journal of Affective Disorders*, *203*, 256–264. http://dx.doi.org/10.1016/j.jad.2016.06.020

Meulders, A., Van Daele, T., Volders, S., & Vlaeyen, J. W. S. (2016). The use of safety-seeking behavior in exposure-based treatments for fear and anxiety: Benefit or burden? A meta-analytic review. *Clinical Psychology Review*, *45*, 144–156. http://dx.doi.org/10.1016/j.cpr.2016.02.002

Niedenthal, P. M. (2007, May 18). Embodying emotion. *Science*, *316*, 1002–1005. http://dx.doi.org/10.1126/science.1136930

Olatunji, B. O., Etzel, E. N., Tomarken, A. J., Ciesielski, B. G., & Deacon, B. (2011). The effects of safety behaviors on health anxiety: An experimental investigation. *Behaviour Research and Therapy*, *49*, 719–728. http://dx.doi.org/10.1016/j.brat.2011.07.008

Pinto-Gouveia, J., Cunha, M. I., & do Céu Salvador, M. (2003). Assessment of social phobia by self-report questionnaires: The social interaction and performance anxiety and avoidance scale and the social phobia safety behaviours scale. *Behavioural and Cognitive Psychotherapy*, *31*, 291–311. http://dx.doi.org/10.1017/S1352465803003059

Plasencia, M. L., Alden, L. E., & Taylor, C. T. (2011). Differential effects of safety behaviour subtypes in social anxiety disorder. *Behaviour Research and Therapy*, *49*, 665–675. http://dx.doi.org/10.1016/j.brat.2011.07.005

Powers, M. B., Smits, J. A., Whitley, D., Bystritsky, A., & Telch, M. J. (2008). The effect of attributional processes concerning medication taking on return of fear. *Journal of Consulting and Clinical Psychology*, *76*, 478–490. http://dx.doi.org/10.1037/0022-006X.76.3.478

Rachman, S. (1994). Pollution of the mind. *Behaviour Research and Therapy*, *32*, 311–314. http://dx.doi.org/10.1016/0005-7967(94)90127-9

Rachman, S. J., & Hodgson, R. J. (1980). *Obsessions and compulsions*. Upper Saddle River, NJ: Prentice Hall.

Rescorla, R. A. (2003). Protection from extinction. *Learning & Behavior*, *31*(2), 124–132. http://dx.doi.org/10.3758/BF03195975

Salkovskis, P. M. (1991). The importance of behaviour in the maintenance of anxiety and panic: A cognitive account. *Behavioural and Cognitive Psychotherapy*, *19*(1), 6–19. http://dx.doi.org/10.1017/S0141347300011472

Salkovskis, P. M., Clark, D. M., & Gelder, M. G. (1996). Cognition–behaviour links in the persistence of panic. *Behaviour Research and Therapy*, *34*, 453–458. http://dx.doi.org/10.1016/0005-7967(95)00083-6

Sloan, T., & Telch, M. J. (2002). The effects of safety-seeking behavior and guided threat reappraisal on fear reduction during exposure: An experimental investigation. *Behaviour Research and Therapy*, *40*, 235–251. http://dx.doi.org/10.1016/S0005-7967(01)00007-9

Telch, M. J., Brouillard, M., Telch, C. F., Agras, W. S., & Taylor, C. B. (1989). Role of cognitive appraisal in panic-related avoidance. *Behaviour Research and Therapy*, *27*, 373–383. http://dx.doi.org/10.1016/0005-7967(89)90007-7

Telch, M. J., & Lancaster, C. L. (2012). Is there room for safety behaviors in exposure therapy for anxiety disorders? In P. Neudeck & H. U. Wittchen (Eds.), *Exposure therapy: Rethinking the model–refining the method* (pp. 313–334). New York, NY: Springer. http://dx.doi.org/10.1007/978-1-4614-3342-2_18

Telch, M. J., Valentiner, D. P., Ilai, D., Petruzzi, D., & Hehmsoth, M. (2000). The facilitative effects of heart-rate feedback in the emotional processing of claustrophobic

fear. *Behaviour Research and Therapy*, *38*, 373–387. http://dx.doi.org/10.1016/S0005-7967(99)00038-8

Telch, M. J., Valentiner, D. P., Ilai, D., Young, P. R., Powers, M. B., & Smits, J. A. (2004). Fear activation and distraction during the emotional processing of claustrophobic fear. *Journal of Behavior Therapy and Experimental Psychiatry*, *35*, 219–232. http://dx.doi.org/10.1016/j.jbtep.2004.03.004

van Uijen, S. L., & Toffolo, M. B. J. (2015). Safety behavior increases obsession-related cognitions about the severity of threat. *Behavior Therapy*, *46*, 521–531. http://dx.doi.org/10.1016/j.beth.2015.04.001

Vervliet, B., & Indekeu, E. (2015). Low-cost avoidance behaviors are resistant to fear extinction in humans. *Frontiers in Behavioral Neuroscience*, *9*(184), 351. http://dx.doi.org/10.3389/fnbeh.2015.00351

Volders, S., Meulders, A., De Peuter, S., Vervliet, B., & Vlaeyen, J. W. (2012). Safety behavior can hamper the extinction of fear of movement-related pain: An experimental investigation in healthy participants. *Behaviour Research and Therapy*, *50*, 735–746. http://dx.doi.org/10.1016/j.brat.2012.06.004

Weck, F., Brehm, U., & Schermelleh-Engel, K. (2012). Development and validation of a questionnaire for the assessment of hypochondriacal safety behavior [in German]. *Zeitschrift für Klinische Psychologie und Psychotherapie*, *41*, 271–281. http://dx.doi.org/10.1026/1616-3443/a000174

3

Intolerance of Uncertainty

Ryan J. Jacoby

After watching a documentary about organic farming in her senior year biology class in college, Michaela became increasingly preoccupied with fears of contracting a terminal illness (e.g., brain cancer, heart disease) from long-term exposure to pesticides and other chemicals in her food.[1] She began removing all nonorganic fruits and vegetables from her diet as well as any premade foods with unnatural ingredients she feared were toxic (e.g., preservatives). She went to great lengths to track down information about where her food came from, until she felt "certain" it was not contaminated from chemicals, and she used websites like WebMD to investigate whether any symptoms she had were signs of cancer. She would repeatedly ask her fiancé for reassurance that any food he had selected or prepared was safe in order to reduce her doubts and anxiety, and she visited the doctor every few months in order to ensure she was healthy because the mounting uncertainty of her health status began to feel unmanageable. Still, Michaela was plagued with doubts over whether she would develop cancer later in life (e.g., 10 years from now). Given that it was ultimately impossible for her to obtain certain and lasting proof that she was cancer-free, she experienced continued daily distress over these matters.

From reading Michaela's case, it becomes clear that she has difficulty managing the uncertainty, doubt, and unpredictability about something as ambiguous, unknown, and subject to change as her health. As a result of this

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[1]All clinical case material has been altered to protect patient confidentiality.

distress, she engages in maladaptive efforts (never fully satisfactory) to reach a sense of certainty about whether she is cancer-free. Indeed, most aspects of life are instilled with implicit uncertainty—for instance, when we use the stove in our home, drive our car to work, or speak up in a meeting, we are accepting some level of risk that our home may burn down, we may be in a car accident, or we may be embarrassed. To navigate life's uncertainties, most people learn to tolerate some degree of the unknown and feel "certain enough" that situations are safe in the absence of clear-cut danger cues. In contrast, some individuals, such as Michaela, display an *intolerance of uncertainty* (IU), which is a transdiagnostic cognitive vulnerability factor in the development and maintenance of anxiety-related disorders (also termed a *dispositional fear of the unknown*; Carleton, 2012, p. 939). Specifically, IU involves beliefs about the necessity of having guarantees in life and one's inability to cope with unpredictability or ambiguity (Carleton, Mulvogue, et al., 2012; Dugas, Schwartz, & Francis, 2004; Obsessive Compulsive Cognitions Working Group, 1997). In other words, those with elevated IU inflate the importance of not knowing "for sure" whether a feared outcome might occur at some point in the future (e.g., the possibility of developing cancer one day from nonorganic produce) and experience a great deal of discomfort over this uncertainty.

More specifically, IU can be broken down into two subcomponents (e.g., McEvoy & Mahoney, 2012). First, *prospective IU*, the information-seeking dimension, refers to a desire for predictability, preferences for knowing what the future holds, anxiety about future uncertain events, and active engagement in seeking information to increase certainty. Michaela, for instance, experiences a foreboding need to know whether she has cancer and makes repeated trips to the doctor for health testing. *Inhibitory IU*, on the other hand, is the avoidant dimension and is characterized by avoidance and paralysis in the face of uncertainty. For example, in order to manage her uncertainty, Michaela avoids consuming certain products if she is unable to confirm that the ingredients are pesticide-free.

Although difficulties with uncertainty are commonplace in the general population and occur along a dimensional spectrum (Carleton, Weeks, et al., 2012), IU is elevated among those with clinical fear and anxiety. Research indicates that IU is a transdiagnostic phenomenon that functions similarly across diagnoses in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013; Carleton, Mulvogue, et al., 2012). However, content themes of uncertainty are typically tied to an individual's particular fears; thus, specific presentations of IU may differ by diagnosis and presentation of fear (Mahoney & McEvoy, 2012), as is discussed further in this chapter.

CONCEPTUAL IMPLICATIONS

Cognitive behavioral models of anxiety-related problems (e.g., Abramowitz, Deacon, & Whiteside, 2019) can be applied to explain the development and persistence of IU. This model implicates the key role of (a) negative

underlying core beliefs about uncertainty, (b) biased information processing in the context of ambiguity, (c) threatening interpretations of uncertainty, and (d) negatively reinforcing certainty-seeking behaviors (see Figure 3.1).

Role of Core Beliefs About Uncertainty

Cognitive approaches to psychopathology suggest that emotional disorders arise from distinct types of dysfunctional cognitions (i.e., core beliefs and interpretations; Beck, 1976). Indeed, IU can be seen as a cognitive "filter" through which individuals view an ambiguous and uncertain world (Buhr & Dugas, 2002). Specifically, individuals with elevated IU endorse global negative beliefs about uncertainty, such as inflating the importance of not knowing something

FIGURE 3.1. Cognitive Behavior Model of Intolerance of Uncertainty
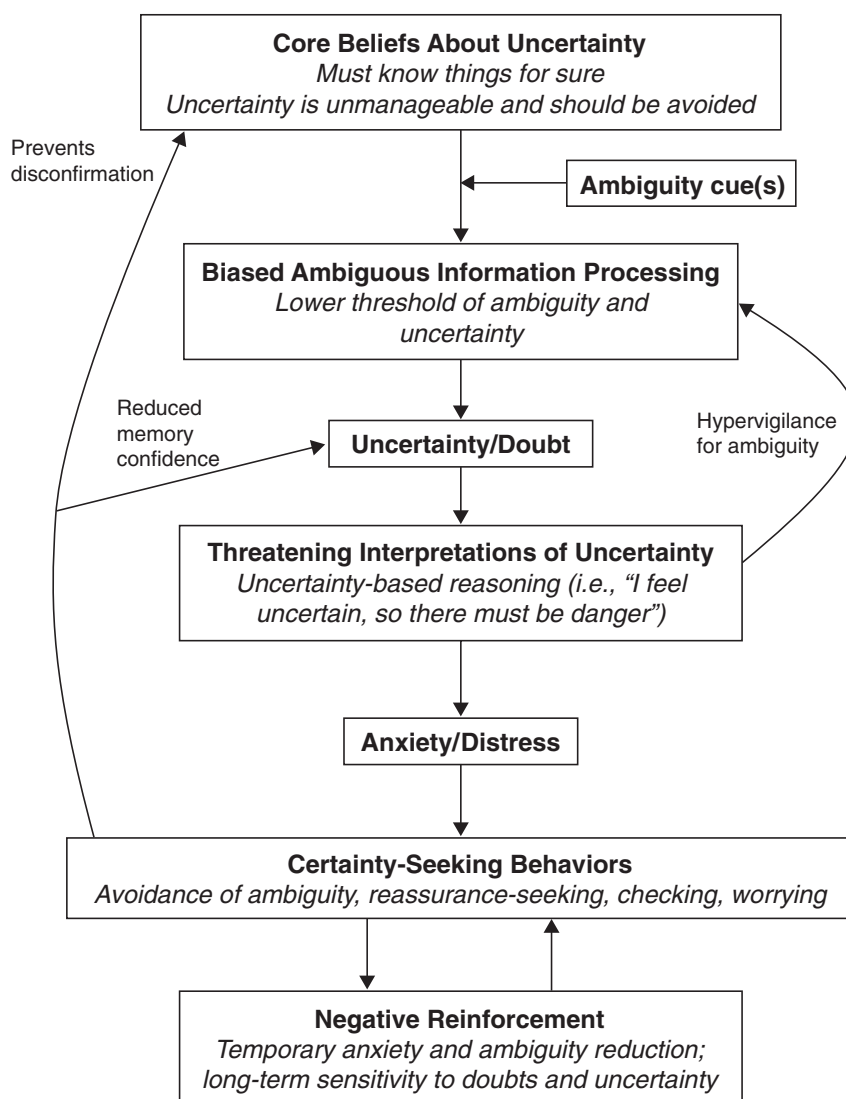
"for sure" and viewing uncertainty as distressing, unmanageable, and something to be avoided (e.g., Buhr & Dugas, 2002; Dugas, Gagnon, Ladouceur, & Freeston, 1998; Dugas et al., 2007). For instance, Michaela's case demonstrates how her health-related fears are driven by powerful underlying beliefs about uncertainty, such as "I need to know *for sure* that I am healthy" and "I can't stand feeling uncertain." Thus, for individuals with elevated IU, normative ambiguous cues in daily life activate underlying maladaptive core beliefs about uncertainty.

The Role of Biased Ambiguous Information Processing

Biased information processing of threat and danger cues also plays a central role in the development and maintenance of fear-based disorders (Beck & Clark, 1997). As has been discussed, most aspects of life are imbued with implicit uncertainty. However, for those with elevated IU, life's ambiguities have become a more *explicit* focus. Indeed, research suggests that individuals with elevated IU have a lower perceptual threshold for ambiguity such that situations that seem "certain enough" to most are perceived as unclear (Ladouceur, Talbot, & Dugas, 1997). Those with high levels of IU also demonstrate enhanced retrieval of stimuli denoting uncertainty (e.g., in a word-learning task in which participants were asked to recall a series of words, half that involved uncertainty [e.g., unknown] and half that did not [e.g., uniform]), indicating selective attention for ambiguous cues in the environment and/or selective recall of uncertainty-laden information (Dugas et al., 2005; see Chapter 12 for a more detailed discussion of selective attention processes in anxiety disorders). Michaela, for example, is likely to perceive and attend to an innocuous skip of her heart beat out of fear that it is sign of heart disease and be acutely aware of commercials on TV that relate to health and wellness. These information-processing biases of ambiguity, in turn, lead to experiences of enhanced uncertainty and doubt.

The Role of Threatening Interpretations of Uncertainty

Whereas most individuals feel "certain-enough" that situations are "safe" in the absence of clear-cut danger cues, as a result of these pansituational negative beliefs about uncertainty and heightened perception of ambiguous information, individuals with IU make threatening interpretations of uncertainty in the moment. Since people mistakenly look to their emotional state for information about the dangerousness of a given situation (Arntz, Rauner, & van den Hout, 1995), the experience of uncertainty serves as a threat cue for some individuals (i.e., uncertainty-based reasoning; Reuman, Jacoby, Fabricant, Herring, & Abramowitz, 2015). For instance, Michaela has learned to interpret uncertainty about her health as threatening (i.e., "If I feel uncertain, there must be danger").

Furthermore, these threatening interpretations of uncertainty lead to heightened daily distress for people like Michaela. In a series of studies,

experimentally increasing uncertainty in nonclinical samples (e.g., by making it an explicit focus in discussing the probability of winning money in a gambling simulation) led to increased worry, anxiety, and urges to perform a safety behavior, suggesting a causal association between threatening interpretations of uncertainty and symptoms of anxiety (de Bruin, Rassin, & Muris, 2006; Grenier & Ladouceur, 2004; Ladouceur, Gosselin, & Dugas, 2000; Reuman et al., 2015; Rosen & Knäuper, 2009). Furthermore, given these threatening interpretations of uncertainty, individuals become hypervigilant for ambiguities in life, thus fueling the likelihood that they will process information as ambiguous in the future.

The Role of Certainty-Seeking Behaviors

In attempts to manage their distress, individuals with elevated IU have difficulty functioning in uncertain or ambiguous situations and engage in unnecessary (and personally costly) certainty-seeking behaviors. Indeed, many behaviors observed across fear and anxiety disorders (e.g., reassurance-seeking, double-checking, worries, mental rituals, excessive information-seeking) can be conceptualized as attempts to restore a sense of "certainty" and reduce anxious arousal (e.g., Behar, DiMarco, Hekler, Mohlman, & Staples, 2009; Einstein, 2014; Holaway, Heimberg, & Coles, 2006). In addition, more avoidant behaviors (e.g., procrastination, avoiding novelty, indecision) can also be construed as methods to minimize uncertainty in situations where one feels it is impossible to be sure (e.g., taking a long time to make a decision for fear it will be the "wrong" one). In laboratory-based studies, individuals with elevated IU apply ineffective problem-solving strategies (Jacoby, Abramowitz, Buck, & Fabricant, 2014) and prioritize decisions that are more certain but less advantageous in the long run (e.g., in ambiguous gambling tasks; Kim et al., 2015; Pushkarskaya et al., 2015; Starcke, Tuschen-Caffier, Markowitsch, & Brand, 2010; Zhang et al., 2015). Michaela has also displayed a number of certainty-seeking behaviors, ranging from asking her fiancé for reassurance to excessively researching her health symptoms on WebMD. Paradoxically, studies indicate that repeated checking and similar attempts to obtain certainty lead to reduced memory confidence (Tolin et al., 2001), thus maintaining feelings of uncertainty and doubt in this cycle. (Memory biases are covered in more detail in Chapter 11.)

The Role of Negative Reinforcement

Although certainty-seeking behaviors may reduce fear and anxiety temporarily (e.g., the momentary sense of relief Michaela feels when her doctor gives her a clean bill of health), given that an absolute *guarantee* of safety is not possible, these behaviors become habitual maladaptive strategies to manage uncertainty (through negative reinforcement; e.g., Einstein, 2014). Such behaviors also maintain long-term preoccupations and sensitivities to doubts and uncertainties about the potential risk of harm and fuel core beliefs about

uncertainty as undesirable, unmanageable, and something to be avoided. In other words, the more Michaela relies on certainty-seeking behaviors, the more such behaviors have begun to escalate her perceived inability to tolerate the ambiguity about her health.

Summary of the Conceptualization of Intolerance of Uncertainty

In summary, Michaela's core beliefs about the necessity of being certain lead to biased information processing and a lower threshold for perceiving the (usually implicit) ubiquity of ambiguity in daily life. The resulting experience of uncertainty and doubt triggers threatening interpretations of uncertainty as something aversive and dangerous and leads to mounting levels of anxiety and distress. Given this discomfort, individuals like Michaela experience urges to gain assurance that feared disasters have not or will not materialize. Checking and other certainty-seeking behaviors reduce such uncertainty, but only temporarily, since an absolute guarantee of safety is not possible. Yet the distress reduction leads to the habitual use of such strategies (through negative reinforcement) as well as increased preoccupation with doubts and uncertainty. Accordingly, a critical focus of the treatment of clinical fear and anxiety is learning to tolerate ambiguity and uncertainty, as opposed to trying to obtain absolute certainty that feared negative outcomes will never occur (see Part II of this handbook).

ASSESSMENT

In initial clinical interviews, uncertainty may or may not be expressed as an explicit focus of patients' concerns. For instance, anxious individuals may emphasize feared worst case scenarios when describing their presenting problems: "I'm anxious about making a mistake in presentations at work"; "I'm worried that my husband will die in a plane crash on one of his business trips"; "I keep having traumatic flashbacks, and I am terrified I will be assaulted again." Thus, it may not be immediately apparent that these individuals grapple with intolerance of uncertainty. However, further probing may reveal beliefs such as "I can't stand not knowing for sure if I will say the wrong thing, so I practice my presentations repeatedly weeks in advance"; "I have so many doubts about whether an accident may have happened, so I compulsively check his flight status trying to be sure everything is okay"; "I can never be certain that I am safe when I leave my house, so I've been avoiding public places." Thus, even if maladaptive beliefs about uncertainty are not immediately volunteered, patients may be making threatening interpretations of daily uncertainties as well as engaging in problematic certainty-seeking behaviors that are important targets for treatment. Accordingly, during an initial assessment, a clinician might provide education about the role of uncertainty beliefs in fear-based disorders and probe whether they relate to the patient's presenting concerns (e.g., "People with anxiety tend to struggle with the *possibility* of something

bad happening, even when the real chance of danger is very low. Because of this they don't tolerate uncertainty well and often feel as if they have to check things over and over to be *absolutely sure*. Is this something you relate to?").

Self-Report Measures

To complement the information gathered in a clinical interview, there are several self-report measures that assess the degree to which individuals endorse uncertainty-related beliefs. These assessment tools have the advantage of using standardized questions with demonstrated reliability and validity that can used to screen for elevated IU. While disorder-specific measures of IU also exist, such as the Perfectionism/Certainty subscale of the Obsessive Beliefs Questionnaire (Obsessive Compulsive Cognitions Working Group, 2001, 2005) and the disorder-specific Intolerance of Uncertainty Scales (Thibodeau et al., 2015), the following measures are applicable across presentations of anxiety and fear.

The Intolerance of Uncertainty Scale (IUS-12; Carleton, Norton, & Asmundson, 2007) measures everyday cognitive, behavioral, and emotional reactions to uncertainty, ambiguous situations, and the future.[2] Participants rate each item on a scale from 1 (*Not at all characteristic of me*) to 5 (*Entirely characteristic of me*). The measure consists of the two dimensions of IU mentioned previously (Jacoby, Fabricant, Leonard, Riemann, & Abramowitz, 2013): Prospective IU (e.g., "I always want to know what the future has in store for me") and Inhibitory IU (e.g., "When I am uncertain I can't function very well"). The IUS-12 demonstrates good psychometric properties in both clinical and nonclinical samples (e.g., Jacoby et al., 2013) as well as associations with symptoms of obsessive-compulsive disorder (OCD), generalized anxiety disorder, social anxiety, panic disorder, health anxiety, neuroticism, and trait anxiety (e.g., McEvoy & Mahoney, 2012). While no formal clinical cut-offs on the IUS-12 have been developed, mean total scores tend to be around or above 40 in clinical samples (Carleton, Mulvogue, et al., 2012; Jacoby et al., 2013). Versions of the IUS-12 have also been adapted in order to tailor the measure to patient's idiosyncratic concerns (i.e., the IUS—Situation-Specific Version; Mahoney & McEvoy, 2012).

The Intolerance of Uncertainty Index (Carleton, Gosselin, & Asmundson, 2010; Gosselin et al., 2008) was created to address concerns that the IUS-12 primarily measures the emotional and behavioral consequences and reactions to IU (e.g., frustration, doubt, avoidance) and does not capture beliefs about uncertainty being intolerable or unacceptable. Specifically, Part A (15 items) assesses general unacceptability of uncertainty, and Part B (30 items) assesses manifestations of uncertainty across anxiety disorders. The measure refrains

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[2]The shorter 12-item version of the IUS is preferred because several of the original items in the 27-item version (Freeston et al., 1994) might better account for symptoms of generalized anxiety disorder than those of other anxiety disorders (Gentes & Ruscio, 2011).

from using emotion words (e.g., anxiety) in order to avoid artificially inflating relationships between IU and anxiety-related psychopathology. Both subscales have excellent internal consistency and acceptable test–retest reliability, are associated with symptoms of worry and depression (Carleton, Gosselin, & Asmundson, 2010), and are highly correlated with the IUS (rs ranging from .68 to .72; Gosselin et al., 2008).

Behavioral Tasks

Although these instruments demonstrate strong psychometric properties, they are designed to be trait measures that capture participants' self-reported general and stable beliefs about uncertainty. Most are limited, therefore, in their use as dependent variables in studies seeking to examine predictors and moderators of state IU (i.e., feelings of IU-related distress captured in the moment). Thus, researchers have begun to evaluate laboratory paradigms as in vivo behavioral measures of IU. These tasks have the advantage of experimentally inducing uncertainty in the laboratory and capturing participants' cognitive, emotional, and behavioral responses to actual ambiguous scenarios.

For instance, previous research has indicated that individuals with high levels of self-reported IU (a) report less confidence over time when making repeated decisions in hypothetical high-risk vignette scenarios (e.g., a fire in one's dorm) given limited and changing information (Jensen, Kind, Morrison, & Heimberg, 2014), (b) sacrifice potential rewards in order to avoid uncertainty-related distress in a laboratory gambling task (Luhmann, Ishida, & Hajcak, 2011), (c) evidence slower typing speed, suggesting greater need for certainty before selecting a key (Thibodeau, Carleton, Gómez-Pérez, & Asmundson, 2013), (d) select gambling options that appear more certain despite being less advantageous (Carleton et al., 2016),[3] and (e) request more information before feeling certain enough to make a decision during a probabilistic inference task (Jacoby et al., 2014; Ladouceur et al., 1997). These tasks, therefore, have begun to elucidate the degree to which individuals with elevated IU evidence impaired performance and heightened distress in the context of ambiguity; however, many tasks have not been used in more than one investigation, and replication of these findings is needed.

CLINICAL IMPLICATIONS

As discussed, intolerance of uncertainty is a central transdiagnostic maintenance factor across domains of fear and anxiety disorders (Boswell, Thompson-Hollands, Farchione, & Barlow, 2013; Carleton, 2012; Carleton, Mulvogue et al.,

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[3]Although see the article for more detailed findings from this study in which results from community volunteers and psychology student undergraduates did not always align.

2012; Einstein, 2014) even above and beyond other cognitive vulnerability factors such as anxiety sensitivity, distress tolerance, and trait anxiety (Norr et al., 2013). Commonly encountered themes of uncertainty for many fear domains are presented in Table 3.1 and each is discussed in turn.

Uncertainty About Safety, Harm, and Disasters

Perhaps the most characteristic presentation of IU revolves around uncertainty regarding potential harm and disasters befalling oneself or one's loved ones. First, such fears could manifest themselves as excessive worries about everyday concerns characteristic of generalized anxiety disorder (e.g., "What if I lose my job? What if my elderly mother slips and falls? What if I'm late to this appointment?"). Theoretical models of generalized anxiety disorder posit that the extreme worry represents an attempt to control the uncertainty associated

TABLE 3.1. Clinical Examples of Intolerance of Uncertainty Across Different Fear Domains

Fear domain	Sample intolerance of uncertainty beliefs
Uncertainty about safety, harm, and disasters	
Generalized worry	I always prepare in advance to make absolutely sure I won't be late to my appointments.
Specific phobias	I would rather be safe than sorry, so I avoid dogs just in case they might bite me.
Responsibility for harm	The smallest doubt that I might have forgotten to turn off the stove stops me from being able to leave for work.
Posttraumatic stress	When I think about returning to the scene of the attack, uncertainty about whether I may be assaulted again paralyses me.
Uncertainty about social evaluation	
Social anxiety	I can't function in social situations if I feel uncertain about whether other people are judging me.
Body-dysmorphic concerns	I do anything I can to avoid feeling uncertain about how I look.
Uncertainty about the significance or meaning of thoughts	
Unacceptable thoughts	Not knowing for sure whether I might one day molest a child is unacceptable and intolerable.
Uncertainty about health, somatic cues, and contamination	
Panic attacks	I can't stand being taken by surprise by unexpected physical sensations like being unable to catch my breath.
Illness anxiety	I always want to know what my future health will be.
Contamination fears	I need to be absolutely sure that I'm not spreading germs to my loved ones.
Uncertainty regarding symmetry or exactness	
"Not just right" experiences	I can't stop rereading until I'm certain that it feels "just right."

with feared future situations (i.e., problem-solving gone awry; Dugas, Buhr, & Ladouceur, 2004; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994), and a large body of research supports strong associations between self-reported IU and worry symptoms (e.g., Buhr & Dugas, 2006; Dugas, Gosselin, & Ladouceur, 2001; Sexton, Norton, Walker, & Norton, 2003). In addition to worry itself as a certainty-seeking behavior, patients with generalized anxiety disorder also engage in maladaptive reassurance seeking (e.g., asking for additional performance reviews from a boss; checking up on an elderly relative) as well as avoidance of situations that may be unclear (e.g., procrastinating on a job assignment in which the outcome may be uncertain). Additionally, although many specific phobias center around fears that something catastrophic will happen in the moment (e.g., "This dog is going to bite me!"; see Chapter 1 on overestimates of threat), certain fears characteristic of specific phobias may also involve uncertainty (e.g., fears leading up to a plane flight, such as "What if the engine of this plane fails and we crash?"). Thus, threatening interpretations of uncertainty in the context of a phobic stimulus as well as maladaptive attempts to resolve it (e.g., researching recent plane crashes, driving instead of flying) may also be present in individuals with specific phobias.

In addition to excessive worries about everyday concerns and catastrophes, uncertainties about safety could also present as unwanted obsessions and doubts concerning responsibility for harm as seen in OCD (e.g., Abramowitz & Nelson, 2007; Holaway, Heimberg, & Coles, 2006; Tolin, Abramowitz, Brigidi, & Foa, 2003). Individuals with this presentation of OCD fear that they will make a decision, action, or mistake that will lead to emotional or physical injury to themselves or their loved ones (e.g., causing a fire, hitting a pedestrian). For example, someone may experience intrusive images of a spouse being the victim of a violent break-in if he were to accidentally leave the door unlocked, which leads to surges of doubt and uncertainty as well as the urge to know *for certain* that this crime is not going to happen. Characteristically, patients with obsessions about responsibility for harm rely on various forms of checking and other compulsive rituals (e.g., examining the home security alarm system for any breaches; calling loved ones for reassurance that everything is okay) and avoidance (e.g., making sure not to be the last one to leave the house) with the aim of restoring a sense of "certainty" and reducing anxiety. Given that an absolute guarantee that one will not be to blame for adverse outcomes is not possible, those with OCD become excessively preoccupied with doubts about safety and responsibility.

Finally, IU can play a role in fears regarding safety following a traumatic event as seen in posttraumatic stress disorder (PTSD; Bardeen, Fergus, & Wu, 2013; Fetzner, Horswill, Boelen, & Carleton, 2013; Oglesby, Boffa, Short, Raines, & Schmidt, 2016). Central uncertainties characteristic of individuals with PTSD are both about the traumatic event itself (e.g., "Could I have responded differently and prevented this from happening? Do others blame me for what happened?"), as well as about one's future safety (e.g.,

"What if I am assaulted again?"). Theories suggest that individuals with PTSD see the *possibility* that a negative event will occur in the future as inherently threatening and that IU beliefs fuel hypervigilance for threat (a hallmark symptom of PTSD). While hypervigilance may be an attempt to eliminate uncertain danger (i.e., by preparing for possible catastrophic events so as to not be caught off guard), these behaviors paradoxically interfere with the ability to emotionally process traumatic experiences (White & Gumley, 2009), thus maintaining posttraumatic stress symptoms.

Uncertainty About Social Evaluation

Social and performance situations are another domain imbued with uncertainty. Individuals with social anxiety disorder exhibit marked and persistent fear of potential embarrassment and negative scrutiny from others (Hofmann & Barlow, 2004), and as a result struggle with uncertainty in social settings (Boelen & Reijntjes, 2009; Carleton, Collimore, & Asmundson, 2010; McEvoy & Mahoney, 2012; Whiting et al., 2014). Similarly, although fewer studies have been conducted, IU also has implications for the development and maintenance of body-dysmorphic disorder (Lavell, Farrell, & Zimmer-Gembeck, 2014; Summers, Matheny, Sarawgi, & Cougle, 2016). For patients with this disorder, the focus is uncertainty about how others view their appearance, which leads to maladaptive appearance-related certainty-seeking behaviors (e.g., excessive body and mirror checking; Phillips, 2005). In these types of evaluative social situations, it is impossible to know what will happen (e.g., "Will I be rejected by the group because of how monstrous I look?") or what others truly think (e.g., "Does my date think I'm awkward?"), which individuals with social anxiety disorder and body dysmorphic disorder have difficulties managing and can lead to social isolation (e.g., avoidance of talking to strangers or even leaving the house). Theories also suggest that IU beliefs fuel postevent processing of social situations in attempts to resolve ambiguities in one's memory of how an interaction transpired (e.g., Did I say the wrong thing and make a bad impression?; Shikatani, Antony, Cassin, & Kuo, 2016).

Uncertainty About the Significance or Meaning of Thoughts

While some individuals with OCD report obsessional doubts about feared disasters that might occur at some point in the future (e.g., fires, break-ins, accidents, as described above), others exhibit doubts concerning truly unknowable questions. These presentations of OCD typically revolve around unwanted, ego-dystonic obsessional thoughts and impulses regarding "taboo" topics (i.e., violence, sex, religion; e.g., "What if I suddenly 'snap' and murder my roommate? What if I commit a religious sin without meaning to?"), which also are associated with high levels of IU (Abramowitz & Deacon, 2006; Holaway et al., 2006; Jacoby et al., 2013; Tolin, Brady, & Hannan, 2008). Individuals with unacceptable thoughts often engage in unobservable mental

rituals in attempts to obtain certainty (e.g., rereading Bible passages to confirm one is a pious person, mentally reviewing actions throughout the day to ensure one didn't molest a child without meaning to) and avoidance of triggers of unacceptable thoughts (e.g., knives, places of worship, children). Given that such questions of one's morality are ultimately unanswerable, individuals with this presentation of OCD struggle with the inability to obtain certainty about matters most individuals take for granted as "certain enough."

Uncertainty About Health, Somatic Cues, and Contamination

As was evident with the case of Michaela, individuals with anxiety-related disorders may also struggle with uncertainty about their physical health, bodily cues, and potential illness or contamination. First, these fears may manifest as uncertainty about a future panic attack in the context of panic disorder (PD; Carleton et al., 2014; Mahoney & McEvoy, 2012; McEvoy & Mahoney, 2012). Specifically, individuals with PD have difficulties managing uncertainty about what internal signs and symptoms may mean (e.g., "Is my racing pulse a sign of a heart attack?"). While in certain contexts an elevated heart rate may be expected (e.g., in the midst of vigorous exercise), when the cause of such sensations is unknown, individuals with PD struggle to manage not knowing whether such symptoms are indicative of something ominous such as death, incapacity, or a loss of control. Second, by their very nature, panic attacks in PD are recurrent and unexpected (American Psychiatric Association, 2013), and accordingly uncertainties about when and where the next attack may occur, how long it will last, and whether others will notice are central concerns. Consequently, maladaptive certainty-seeking behaviors such as checking one's pulse and avoiding panic-inducing activities and substances (e.g., caffeine, exercise, sex) contribute to the vicious cycle of PD.

Such fears may also generalize to more pervasive health anxiety concerns characteristic of illness anxiety disorder (IAD; Boelen & Carleton, 2012; Deacon & Abramowitz, 2008; Fergus & Valentiner, 2011). Individuals with IAD hold dysfunctional beliefs about uncertainty of their health status (e.g., To be in good health means one should be completely symptom-free) that lead to hypervigilance to both external (e.g., hearing about the rise in heart disease on the news) and internal somatic cues (e.g., headaches, an abnormal skin blemish). This hypervigilance increases opportunities to notice (and make catastrophic misinterpretations of) benign bodily changes (e.g., "Is this a tension headache or a sign of brain cancer?"; Olatunji, Deacon, Abramowitz, & Valentiner, 2007). The resulting anxious arousal patients with IAD experience while worrying about illness further reinforces beliefs that there is something seriously wrong with their health and leads to maladaptive certainty-seeking behaviors (e.g., online research about medical conditions, repeated visits to specialists for second opinions).

Finally, such fears may manifest themselves as fears of future contamination from coming into contact with dirt or germs, as observed in some individuals with OCD (e.g., Jensen & Heimberg, 2015; Sarawgi, Oglesby, &

Cougle, 2013). Although exposures for contamination fears often focus on the here and now (e.g., the ability to touch surfaces in a public restroom), typically patients with contamination fears are not concerned that they will exhibit signs and symptoms of contamination in the hour-long session, but rather are flooded with uncertainty about germs they may have contracted that will lead to future consequences either for themselves or others (e.g., "Will I contract HIV and develop signs of AIDS 10 years from now?"). As a result, decontamination rituals (e.g., excessive hand washing, showering, use of chemical cleaners and solvents) are an attempt to feel "certain" that the contaminant threat has been eliminated.

Uncertainty Regarding "Not Just Right Experiences"

Finally, IU contributes to the distress of individuals who experience uncertainty regarding "not just right experiences" (NJREs; Bottesi, Ghisi, Sica, & Freeston, 2017); this is a less common presentation of IU compared with other forms. These individuals grapple with uncertainty about whether an action can be stopped or has been completed (e.g., when a passage in a book has been read "correctly"). They may also fear "what if" the uncomfortable sensation that something is "not just right" continues or escalate indefinitely. Moreover, NJRE-related behaviors may be performed in attempts to obtain certainty that a catastrophic event will not occur (i.e., magical thinking). For instance, someone may perform certain tasks such as turning a light switch off and on an "even," "balanced," or "symmetrical" number of times in response to a sense of dread or "bad luck" resulting from unevenness. While individuals with this presentation of OCD typically recognize that the link between their behaviors and catastrophic outcomes (e.g., one's parents' safety) is illogical, they typically feel it is "better to be safe than sorry," and so they perform rituals "just in case" to resolve doubts and uncertainty.

CONCLUSION

In summary, IU (defined as the fear of the unknown) is a transdiagnostic cognitive vulnerability factor that contributes to the development and maintenance of anxiety disorders. Cognitive behavior models suggest that individuals with elevated IU hold underlying negative core beliefs about uncertainty, have biased information processing in the context of ambiguity, and make threatening interpretations of uncertainty. In attempts to manage the resulting distress, these individuals perform unnecessary and personally costly certainty-seeking behaviors that are negatively reinforcing, but only provide temporary relief since an absolute guarantee of safety is not possible. Clinical presentations of IU manifest transdiagnostically across anxiety and fear-based disorders including uncertainty about safety, harm, and disasters (e.g., as seen in GAD or PTSD); social evaluation (as seen in SAD or BDD); the significance

or meaning of thoughts (as seen in OCD); or health, somatic cues, and contamination (e.g., as seen in PD and IAD).

Although the treatment of anxiety and related disorders is discussed in greater detail in the chapters of Part II of this handbook, an important lesson patients should draw from anxiety-based treatment is the willingness to live with acceptable levels of uncertainty. Cognitive techniques (Wilhelm & Steketee, 2006) can be used to challenge a patient's need to be certain. Here it is important not to get into a debate over the likelihood of feared consequences occurring, since IU persists even if individuals recognize that their feared consequences are unlikely, and such challenges will likely have only a transient effect. Rather, cognitive strategies should target the patient's IU directly to modify beliefs that uncertainty is unmanageable. Exposure exercises can also be viewed as vehicles for fostering better tolerance of uncertainty. The goal of these exercises is to help patients learn that uncertainty is more manageable than expected and to disconfirm the expectation that they need to perform certainty-seeking behaviors in order to deal with these feelings (Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014).

REFERENCES

Abramowitz, J. S., & Deacon, B. J. (2006). Psychometric properties and construct validity of the Obsessive-Compulsive Inventory—Revised: Replication and extension with a clinical sample. *Journal of Anxiety Disorders, 20,* 1016–1035. http://dx.doi.org/10.1016/j.janxdis.2006.03.001

Abramowitz, J. S., Deacon, B. J., & Whiteside, S. P. H. (2019). *Exposure therapy for anxiety: Principles and practice* (2nd ed.). New York, NY: Guilford Press.

Abramowitz, J. S., & Nelson, C. A. (2007). Treating doubting and checking concerns. In M. M. Antony, C. Purdon, & L. J. Summerfeldt (Eds.), *Psychological treatment of obsessive-compulsive disorder: Fundamentals and beyond* (pp. 169–186). Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/11543-007

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.

Arntz, A., Rauner, M., & van den Hout, M. (1995). "If I feel anxious, there must be danger": Ex-consequentia reasoning in inferring danger in anxiety disorders. *Behaviour Research and Therapy, 33,* 917–925. http://dx.doi.org/10.1016/0005-7967(95)00032-S

Bardeen, J. R., Fergus, T. A., & Wu, K. D. (2013). The interactive effect of worry and intolerance of uncertainty on posttraumatic stress symptoms. *Cognitive Therapy and Research, 37,* 742–751. http://dx.doi.org/10.1007/s10608-012-9512-1

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders.* Madison, CT: International Universities Press.

Beck, A. T., & Clark, D. A. (1997). An information processing model of anxiety: Automatic and strategic processes. *Behaviour Research and Therapy, 35,* 49–58. http://dx.doi.org/10.1016/S0005-7967(96)00069-1

Behar, E., DiMarco, I. D., Hekler, E. B., Mohlman, J., & Staples, A. M. (2009). Current theoretical models of generalized anxiety disorder (GAD): Conceptual review and treatment implications. *Journal of Anxiety Disorders, 23,* 1011–1023. http://dx.doi.org/10.1016/j.janxdis.2009.07.006

Boelen, P. A., & Carleton, R. N. (2012). Intolerance of uncertainty, hypochondriacal concerns, obsessive-compulsive symptoms, and worry. *Journal of Nervous and Mental Disease, 200,* 208–213. http://dx.doi.org/10.1097/NMD.0b013e318247cb17

Boelen, P. A., & Reijntjes, A. (2009). Intolerance of uncertainty and social anxiety. *Journal of Anxiety Disorders*, *23*, 130–135. http://dx.doi.org/10.1016/j.janxdis.2008.04.007

Boswell, J. F., Thompson-Hollands, J., Farchione, T. J., & Barlow, D. H. (2013). Intolerance of uncertainty: A common factor in the treatment of emotional disorders. *Journal of Clinical Psychology, 69*, 630–645. http://dx.doi.org/10.1002/jclp.21965

Bottesi, G., Ghisi, M., Sica, C., & Freeston, M. H. (2017). Intolerance of uncertainty, not just right experiences, and compulsive checking: Test of a moderated mediation model on a non-clinical sample. *Comprehensive Psychiatry*, *73*, 111–119. http://dx.doi.org/10.1016/j.comppsych.2016.11.014

Buhr, K., & Dugas, M. J. (2002). The Intolerance of Uncertainty Scale: Psychometric properties of the English version. *Behaviour Research and Therapy*, *40*, 931–945. http://dx.doi.org/10.1016/S0005-7967(01)00092-4

Buhr, K., & Dugas, M. J. (2006). Investigating the construct validity of intolerance of uncertainty and its unique relationship with worry. *Journal of Anxiety Disorders, 20*, 222–236. http://dx.doi.org/10.1016/j.janxdis.2004.12.004

Carleton, R. N. (2012). The intolerance of uncertainty construct in the context of anxiety disorders: Theoretical and practical perspectives. *Expert Review of Neurotherapeutics*, *12*, 937–947. http://dx.doi.org/10.1586/ern.12.82

Carleton, R. N., Collimore, K. C., & Asmundson, G. J. G. (2010). "It's not just the judgements—It's that I don't know": Intolerance of uncertainty as a predictor of social anxiety. *Journal of Anxiety Disorders*, *24*, 189–195. http://dx.doi.org/10.1016/j.janxdis.2009.10.007

Carleton, R. N., Duranceau, S., Freeston, M. H., Boelen, P. A., McCabe, R. E., & Antony, M. M. (2014). "But it might be a heart attack": Intolerance of uncertainty and panic disorder symptoms. *Journal of Anxiety Disorders*, *28*, 463–470. http://dx.doi.org/10.1016/j.janxdis.2014.04.006

Carleton, R. N., Duranceau, S., Shulman, E. P., Zerff, M., Gonzales, J., & Mishra, S. (2016). Self-reported intolerance of uncertainty and behavioural decisions. *Journal of Behavior Therapy and Experimental Psychiatry*, *51*, 58–65. http://dx.doi.org/10.1016/j.jbtep.2015.12.004

Carleton, R. N., Gosselin, P., & Asmundson, G. J. G. (2010). The intolerance of uncertainty index: Replication and extension with an English sample. *Psychological Assessment*, *22*, 396–406. http://dx.doi.org/10.1037/a0019230

Carleton, R. N., Mulvogue, M. K., Thibodeau, M. A., McCabe, R. E., Antony, M. M., & Asmundson, G. J. G. (2012). Increasingly certain about uncertainty: Intolerance of uncertainty across anxiety and depression. *Journal of Anxiety Disorders*, *26*, 468–479. http://dx.doi.org/10.1016/j.janxdis.2012.01.011

Carleton, R. N., Norton, M. A. P., & Asmundson, G. J. G. (2007). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale. *Journal of Anxiety Disorders*, *21*, 105–117. http://dx.doi.org/10.1016/j.janxdis.2006.03.014

Carleton, R. N., Weeks, J. W., Howell, A. N., Asmundson, G. J. G., Antony, M. M., & McCabe, R. E. (2012). Assessing the latent structure of the intolerance of uncertainty construct: An initial taxometric analysis. *Journal of Anxiety Disorders*, *26*, 150–157. http://dx.doi.org/10.1016/j.janxdis.2011.10.006

Craske, M. G., Treanor, M., Conway, C. C., Zbozinek, T., & Vervliet, B. (2014). Maximizing exposure therapy: An inhibitory learning approach. *Behaviour Research and Therapy*, *58*, 10–23. http://dx.doi.org/10.1016/j.brat.2014.04.006

Deacon, B., & Abramowitz, J. S. (2008). Is hypochondriasis related to obsessive compulsive-disorder, panic disorder, or both? An empirical evaluation. *Journal of Cognitive Psychotherapy*, *22*, 115–127. http://dx.doi.org/10.1891/0889-8391.22.2.115

de Bruin, G. O., Rassin, E., & Muris, P. (2006). Worrying in the lab: Does intolerance of uncertainty have predictive value? *Behaviour Change*, *23*(2), 138–147. http://dx.doi.org/10.1375/bech.23.2.138

Dugas, M. J., Buhr, K., & Ladouceur, R. (2004). The role of intolerance of uncertainty in etiology and maintenance. In R. G. Heimberg, C. L. Turk, & D. S. Mennin (Eds.), *Generalized anxiety disorder: Advances in research and practice* (pp. 143–163). New York, NY: Guilford Press.

Dugas, M. J., Gagnon, F., Ladouceur, R., & Freeston, M. H. (1998). Generalized anxiety disorder: A preliminary test of a conceptual model. *Behaviour Research and Therapy*, *36*, 215–226. http://dx.doi.org/10.1016/S0005-7967(97)00070-3

Dugas, M. J., Gosselin, P., & Ladouceur, R. (2001). Intolerance of uncertainty and worry: Investigating specificity in a nonclinical sample. *Cognitive Therapy and Research*, *25*, 551–558. http://dx.doi.org/10.1023/A:1005553414688

Dugas, M. J., Hedayati, M., Karavidas, A., Buhr, K., Francis, K., & Phillips, N. A. (2005). Intolerance of uncertainty and information processing: Evidence of biased recall and interpretations. *Cognitive Therapy and Research*, *29*, 57–70. http://dx.doi.org/10.1007/s10608-005-1648-9

Dugas, M. J., Savard, P., Gaudet, A., Turcotte, J., Laugesen, N., Robichaud, M., . . . Koerner, N. (2007). Can the components of a cognitive model predict the severity of generalized anxiety disorder? *Behavior Therapy*, *38*, 169–178. http://dx.doi.org/10.1016/j.beth.2006.07.002

Dugas, M. J., Schwartz, A., & Francis, K. (2004). Intolerance of uncertainty, worry, and depression. *Cognitive Therapy and Research*, *28*, 835–842. http://dx.doi.org/10.1007/s10608-004-0669-0

Einstein, D. A. (2014). Extension of the transdiagnostic model to focus on intolerance of uncertainty: A review of the literature and implications for treatment. *Clinical Psychology: Science and Practice*, *21*, 280–300. http://dx.doi.org/10.1111/cpsp.12077

Fergus, T. A., & Valentiner, D. P. (2011). Intolerance of uncertainty moderates the relationship between catastrophic health appraisals and health anxiety. *Cognitive Therapy and Research*, *35*, 560–565. http://dx.doi.org/10.1007/s10608-011-9392-9

Fetzner, M. G., Horswill, S. C., Boelen, P. A., & Carleton, R. N. (2013). Intolerance of uncertainty and PTSD symptoms: Exploring the construct relationship in a community sample with a heterogeneous trauma history. *Cognitive Therapy and Research*, *37*, 725–734. http://dx.doi.org/10.1007/s10608-013-9531-6

Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences*, *17*, 791–802. http://dx.doi.org/10.1016/0191-8869(94)90048-5

Gentes, E. L., & Ruscio, A. M. (2011). A meta-analysis of the relation of intolerance of uncertainty to symptoms of generalized anxiety disorder, major depressive disorder, and obsessive-compulsive disorder. *Clinical Psychology Review*, *31*, 923–933. http://dx.doi.org/10.1016/j.cpr.2011.05.001

Gosselin, P., Ladouceur, R., Evers, A., Laverdière, A., Routhier, S., & Tremblay-Picard, M. (2008). Evaluation of intolerance of uncertainty: Development and validation of a new self-report measure. *Journal of Anxiety Disorders*, *22*, 1427–1439. http://dx.doi.org/10.1016/j.janxdis.2008.02.005

Grenier, S., & Ladouceur, R. (2004). Manipulation de l'intolérance a l'incertitude et inquiétudes. [Manipulation of Intolerance of Uncertainty and worries]. *Canadian Journal of Behavioural Science/Revue Canadienne Des Sciences Du Comportement, 36*(1), 56–65. http://dx.doi.org/10.1037/h0087216

Hofmann, S. G., & Barlow, D. H. (2004). Social phobia (social anxiety disorder). In D. H. Barlow (Ed.), *Anxiety and its disorders: The nature and treatment of anxiety and panic* (2nd ed., pp. 454–476). New York, NY: Guilford Press.

Holaway, R. M., Heimberg, R. G., & Coles, M. E. (2006). A comparison of intolerance of uncertainty in analogue obsessive-compulsive disorder and generalized anxiety disorder. *Journal of Anxiety Disorders*, *20*, 158–174. http://dx.doi.org/10.1016/j.janxdis.2005.01.002

Jacoby, R. J., Abramowitz, J. S., Buck, B. E., & Fabricant, L. E. (2014). How is the Beads Task related to intolerance of uncertainty in anxiety disorders? *Journal of Anxiety Disorders*, *28*, 495–503. http://dx.doi.org/10.1016/j.janxdis.2014.05.005

Jacoby, R. J., Fabricant, L. E., Leonard, R. C., Riemann, B. C., & Abramowitz, J. S. (2013). Just to be certain: Confirming the factor structure of the intolerance of uncertainty scale in patients with obsessive-compulsive disorder. *Journal of Anxiety Disorders*, *27*, 535–542. http://dx.doi.org/10.1016/j.janxdis.2013.07.008

Jensen, D., & Heimberg, R. G. (2015). Domain-specific intolerance of uncertainty in socially anxious and contamination-focused obsessive-compulsive individuals. *Cognitive Behaviour Therapy*, *44*(1), 54–62. http://dx.doi.org/10.1080/16506073.2014.959039

Jensen, D., Kind, A. J., Morrison, A. S., & Heimberg, R. G. (2014). Intolerance of uncertainty and immediate decision-making in high-risk situations. *Journal of Experimental Psychopathology*, *5*, 178–190. http://dx.doi.org/10.5127/jep.035113

Kim, H. W., Kang, J. I., Namkoong, K., Jhung, K., Ha, R. Y., & Kim, S. J. (2015). Further evidence of a dissociation between decision-making under ambiguity and decision-making under risk in obsessive-compulsive disorder. *Journal of Affective Disorders*, *176*, 118–124. http://dx.doi.org/10.1016/j.jad.2015.01.060

Ladouceur, R., Gosselin, P., & Dugas, M. J. (2000). Experimental manipulation of intolerance of uncertainty: A study of a theoretical model of worry. *Behaviour Research and Therapy*, *38*, 933–941. http://dx.doi.org/10.1016/S0005-7967(99)00133-3

Ladouceur, R., Talbot, F., & Dugas, M. J. (1997). Behavioral expressions of intolerance of uncertainty in worry. Experimental findings. *Behavior Modification*, *21*, 355–371. http://dx.doi.org/10.1177/01454455970213006

Lavell, C. H., Farrell, L. J., & Zimmer-Gembeck, M. J. (2014). Do obsessional belief domains relate to body dysmorphic concerns in undergraduate students? *Journal of Obsessive-Compulsive and Related Disorders*, *3*, 354–358. http://dx.doi.org/10.1016/j.jocrd.2014.10.001

Luhmann, C. C., Ishida, K., & Hajcak, G. (2011). Intolerance of uncertainty and decisions about delayed, probabilistic rewards. *Behavior Therapy*, *42*, 378–386. http://dx.doi.org/10.1016/j.beth.2010.09.002

Mahoney, A. E. J., & McEvoy, P. M. (2012). Trait versus situation-specific intolerance of uncertainty in a clinical sample with anxiety and depressive disorders. *Cognitive Behaviour Therapy*, *41*, 26–39. http://dx.doi.org/10.1080/16506073.2011.622131

McEvoy, P. M., & Mahoney, A. E. J. (2012). To be sure, to be sure: Intolerance of uncertainty mediates symptoms of various anxiety disorders and depression. *Behavior Therapy*, *43*, 533–545. http://dx.doi.org/10.1016/j.beth.2011.02.007

Norr, A. M., Oglesby, M. E., Capron, D. W., Raines, A. M., Korte, K. J., & Schmidt, N. B. (2013). Evaluating the unique contribution of intolerance of uncertainty relative to other cognitive vulnerability factors in anxiety psychopathology. *Journal of Affective Disorders, 151*, 136–142. http://dx.doi.org/10.1016/j.jad.2013.05.063

Obsessive Compulsive Cognitions Working Group. (1997). Cognitive assessment of obsessive-compulsive disorder. *Behaviour Research and Therapy*, *35*, 667–681. http://dx.doi.org/10.1016/S0005-7967(97)00017-X

Obsessive Compulsive Cognitions Working Group. (2001). Development and initial validation of the obsessive beliefs questionnaire and the interpretation of intrusions inventory. *Behaviour Research and Therapy*, *39*, 987–1006. http://dx.doi.org/10.1016/S0005-7967(00)00085-1

Obsessive Compulsive Cognitions Working Group. (2005). Psychometric validation of the obsessive belief questionnaire and interpretation of intrusions inventory—Part 2: Factor analyses and testing of a brief version. *Behaviour Research and Therapy*, *43*, 1527–1542. http://dx.doi.org/10.1016/j.brat.2004.07.010

Oglesby, M. E., Boffa, J. W., Short, N. A., Raines, A. M., & Schmidt, N. B. (2016). Intolerance of uncertainty as a predictor of post-traumatic stress symptoms following a

traumatic event. *Journal of Anxiety Disorders*, *41*, 82–87. http://dx.doi.org/10.1016/j.janxdis.2016.01.005

Olatunji, B. O., Deacon, B. J., Abramowitz, J. S., & Valentiner, D. P. (2007). Body vigilance in nonclinical and anxiety disorder samples: Structure, correlates, and prediction of health concerns. *Behavior Therapy*, *38*, 392–401. http://dx.doi.org/10.1016/j.beth.2006.09.002

Phillips, K. A. (2005). *The broken mirror: Understanding and treating body dysmorphic disorder* (Rev expanded ed.). Oxford, England: Oxford University Press.

Pushkarskaya, H., Tolin, D., Ruderman, L., Kirshenbaum, A., Kelly, J. M., Pittenger, C., & Levy, I. (2015). Decision-making under uncertainty in obsessive-compulsive disorder. *Journal of Psychiatric Research*, *69*, 166–173. http://dx.doi.org/10.1016/j.jpsychires.2015.08.011

Reuman, L., Jacoby, R. J., Fabricant, L. E., Herring, B., & Abramowitz, J. S. (2015). Uncertainty as an anxiety cue at high and low levels of threat. *Journal of Behavior Therapy and Experimental Psychiatry*, *47*, 111–119. http://dx.doi.org/10.1016/j.jbtep.2014.12.002

Rosen, N. O., & Knäuper, B. (2009). A little uncertainty goes a long way: State and trait differences in uncertainty interact to increase information seeking but also increase worry. *Health Communication*, *24*, 228–238. http://dx.doi.org/10.1080/10410230902804125

Sarawgi, S., Oglesby, M. E., & Cougle, J. R. (2013). Intolerance of uncertainty and obsessive-compulsive symptom expression. *Journal of Behavior Therapy and Experimental Psychiatry*, *44*, 456–462. http://dx.doi.org/10.1016/j.jbtep.2013.06.001

Sexton, K. A., Norton, P. J., Walker, J. R., & Norton, G. R. (2003). Hierarchical model of generalized and specific vulnerabilities in anxiety. *Cognitive Behaviour Therapy*, *32*, 82–94. http://dx.doi.org/10.1080/16506070302321

Shikatani, B., Antony, M. M., Cassin, S. E., & Kuo, J. R. (2016). Examining the role of perfectionism and intolerance of uncertainty in postevent processing in social anxiety disorder. *Journal of Psychopathology and Behavioral Assessment*, *38*, 297–306. http://dx.doi.org/10.1007/s10862-015-9516-8

Starcke, K., Tuschen-Caffier, B., Markowitsch, H. J., & Brand, M. (2010). Dissociation of decisions in ambiguous and risky situations in obsessive-compulsive disorder. *Psychiatry Research*, *175*(1–2), 114–120. http://dx.doi.org/10.1016/j.psychres.2008.10.022

Summers, B. J., Matheny, N. L., Sarawgi, S., & Cougle, J. R. (2016). Intolerance of uncertainty in body dysmorphic disorder. *Body Image*, *16*, 45–53. http://dx.doi.org/10.1016/j.bodyim.2015.11.002

Thibodeau, M. A., Carleton, R. N., Gómez-Pérez, L., & Asmundson, G. J. G. (2013). "What if I make a mistake?" Intolerance of uncertainty is associated with poor behavioral performance. *Journal of Nervous and Mental Disease*, *201*, 760–766. http://dx.doi.org/10.1097/NMD.0b013e3182a21298

Thibodeau, M. A., Carleton, R. N., McEvoy, P. M., Zvolensky, M. J., Brandt, C. P., Boelen, P. A., . . . Asmundson, G. J. G. (2015). Developing scales measuring disorder-specific intolerance of uncertainty (DSIU): A new perspective on transdiagnostic. *Journal of Anxiety Disorders*, *31*, 49–57. http://dx.doi.org/10.1016/j.janxdis.2015.01.006

Tolin, D. F., Abramowitz, J. S., Brigidi, B. D., Amir, N., Street, G. P., & Foa, E. B. (2001). Memory and memory confidence in obsessive-compulsive disorder. *Behaviour Research and Therapy*, *39*, 913–927. http://dx.doi.org/10.1016/S0005-7967(00)00064-4

Tolin, D. F., Abramowitz, J. S., Brigidi, B. D., & Foa, E. B. (2003). Intolerance of uncertainty in obsessive-compulsive disorder. *Journal of Anxiety Disorders*, *17*, 233–242. http://dx.doi.org/10.1016/S0887-6185(02)00182-2

Tolin, D. F., Brady, R. E., & Hannan, S. (2008). Obsessional beliefs and symptoms of obsessive-compulsive disorder in a clinical sample. *Journal of Psychopathology and Behavioral Assessment*, *30*(1), 31–42. http://dx.doi.org/10.1007/s10862-007-9076-7

White, R. G., & Gumley, A. I. (2009). Postpsychotic posttraumatic stress disorder: Associations with fear of recurrence and intolerance of uncertainty. *Journal of Nervous and Mental Disease*, *197*, 841–849. http://dx.doi.org/10.1097/NMD.0b013e3181bea625

Whiting, S. E., Jenkins, W. S., May, A. C., Rudy, B. M., Davis, T. E., III, & Reuther, E. T. (2014). The role of intolerance of uncertainty in social anxiety subtypes. *Journal of Clinical Psychology*, *70*, 260–272. http://dx.doi.org/10.1002/jclp.22024

Wilhelm, S., & Steketee, G. S. (2006). Desire for certainty. In *Cognitive therapy for obsessive compulsive disorder: A guide for professionals* (pp. 111–120). Oakland, CA: New Harbinger.

Zhang, L., Dong, Y., Ji, Y., Zhu, C., Yu, F., Ma, H., . . . Wang, K. (2015). Dissociation of decision making under ambiguity and decision making under risk: A neurocognitive endophenotype candidate for obsessive-compulsive disorder. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, *57*, 60–68. http://dx.doi.org/10.1016/j.pnpbp.2014.09.005

4

Anxiety Sensitivity

Steven Taylor

> When Dave was a kid, he was stung by a wasp while playing in the park.[1]
> His face puffed up like a balloon, and his eyelids swelled until he couldn't see.
> His throat closed up until her could hardly breathe. His mom rushed him to
> the hospital, where they gave Dave adrenaline. The doctor said he was lucky to
> be alive.
>
> Ever since that experience, Dave has been worried about his health, and
> particularly about allergic reactions. This morning the air was so humid and
> smoggy that he had trouble catching his breath. He started to worry that he
> might be allergic to smog. Dave's mouth went dry and he felt a lump in his
> throat, which scared him. He started to breathe faster so that he would get
> enough air. But things only got worse. Dave felt dizzy, his face went numb, and
> his heart started pounding. His chest was so tight that he could hardly catch his
> breath. He was paralyzed with fear and sure he was going to die. Frantically,
> Dave grabbed his cell phone and called for an ambulance. By the time it arrived
> he felt better. It wasn't an allergic reaction. Just his nerves. He was afraid that
> the next time he would not be so lucky.

Dave has elevated anxiety sensitivity (AS), that is, an intense fear of
arousal-related bodily sensations, arising from dysfunctional beliefs about
the meaning and consequences of the sensations (Reiss, Peterson, Gursky, &

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[1]All clinical case material has been altered to protect patient confidentiality.

McNally, 1986). AS varies in severity. People with high levels of AS tend to believe that arousal-related bodily sensations are dangerous. People with high AS tend to harbor beliefs such as "If my heart beats rapidly, it means that I might be having a heart attack," or "If my hands tremble, people will reject me," or "If I feel lightheaded, it means that I might have a brain tumor." People with low levels of AS tend to believe that arousal-related sensations such as palpitations, trembling, or lightheadedness are harmless and inconsequential.

An older concept, similar to AS, is "fear-of-fear" (Goldstein & Chambless, 1978, p. 47). According to Goldstein and Chambless (1978), the experience of recurrent panic attacks in people with panic disorder and agoraphobia was said to cause these individuals to acquire a heightened fear-of-fear, which exacerbated their panic, anxiety, and agoraphobic avoidance. In comparison to the conceptualization of fear-of-fear, heightened AS need not be exclusively a consequence of panic attacks. AS may be an antecedent factor, predating any panic- or anxiety-related psychopathology.

Another concept similar to AS is found in Clark's (1986) cognitive model of panic. Here, panic attacks are said to arise from a catastrophic misinterpretation of bodily sensations. People who are prone to recurrent panic attacks are said to have an enduring tendency to catastrophically misinterpret bodily sensations, especially arousal-related bodily sensations. This is very similar to the concept of AS, with the main difference being that AS is broader, being implicated in a range of anxiety or distress related disorders and not limited to panic attacks or panic disorder.

CONCEPTUAL IMPLICATIONS

Empirical and Conceptual Foundations

AS is conceptualized as an amplification factor that exacerbates anxiety, panic, and other forms of distress (Reiss et al., 1986). For example, by becoming anxious about arousal-related bodily sensations, the feared sensations themselves become amplified and anxiety escalates. Accumulating evidence indicates that AS is a predisposing factor for many different types of psychopathology, although research shows that AS is most strongly related to panic disorder, generalized anxiety disorder, and posttraumatic stress disorder (PTSD; Naragon-Gainey, 2010).

Longitudinal investigations have found that AS predicts the first onset of panic attacks and the development of other forms of pathology, particularly anxiety and related disorders (e.g., Schmidt et al., 2010; Schmidt, Lerew, & Jackson, 1999). Longitudinal research further suggests that AS can interact with stressful life events to give rise to panic and anxiety (Schmidt et al., 1999). That is, stressful events can produce intense arousal-related sensations. People with high AS interpret these sensations as being highly dangerous, which in turn leads to a cycle of heightened anxiety, distress, and panic.

Stability

AS, as assessed by contemporary instruments such as the Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007), tends to be stable (traitlike) in the absence of treatment (e.g., Farris et al., 2015; Taylor et al., 2007). However, the severity of a person's AS can be reduced by various interventions, as described later in this chapter. Thus, AS is a modifiable risk factor for psychopathology. It is of transdiagnostic relevance in that elevated scores on AS or its factors is associated with a range of psychiatric disorders.

Structure

Structurally, people can be classified into high versus low AS (e.g., Bernstein et al., 2007; Bernstein et al., 2010). High AS is associated with anxiety disorders, particularly panic disorder, whereas low AS is characteristic of most controls. Within these classes AS is composed of multiple dimensions, with the three most robust (reliably identified) dimensions being (a) cognitive concerns (e.g., beliefs that symptoms like racing thoughts are harbingers of danger), (b) physical concerns (e.g., beliefs that palpitations lead to heart attacks), and (c) social concerns (e.g., beliefs that publicly observable anxiety reactions such as trembling lead to social rejection; Taylor et al., 2007).

Etiology

Behavioral-genetic (twin) studies show that individual differences in AS are the result of a combination of genetic and environmental factors (Brown et al., 2012; Taylor, Jang, Stewart, & Stein, 2008). The genetic factors are additive in nature rather than being dominance effects. That is, it appears likely that numerous genes, each with small effects, incrementally add to the person's risk for having high AS. The actual genes (polymorphisms) involved in AS are currently unknown. Such genes likely play a role in the brain structures involved in the processing of threat, such as the anterior cingulate cortex, medial prefrontal cortex, and insula. Neuroimaging research suggests that a person's level of AS is positively correlated with the degree of activation of these structures when a person is present with threat-related stimuli (Holtz, Pané-Farré, Wendt, Lotze, & Hamm, 2012; Poletti et al., 2015).

With regard to the environmental factors involved in AS, learning experiences may play a role, especially those experiences that cause a person to believe that arousal-related sensations are dangerous (Knapp, Frala, Blumenthal, Badour, & Leen-Feldner, 2013; Stewart et al., 2001). This was illustrated in the case of Dave at the beginning of this chapter. Relevant learning experiences include information transmission (e.g., being told that palpitations are dangerous), modeling and observational learning (e.g., having a parent who avoids physical exertion because of beliefs that their lungs or heart are weak), and possibly interoceptive (Pavlovian) conditioning (Stewart et al., 2001).

ASSESSMENT

AS is assessed in three types of ways: self-report measures (questionnaires), clinical interview, and interoceptive exposure exercises in which the latter are used elicit bodily sensations and thereby observe the person's response. Each method has its particular strengths and so each are commonly used in the assessment of AS. Self-report measures have the advantage of being standardize and yield scores that can be compared to norms. A clinical interview offers a more nuanced assessment, in which the clinician can assess idiosyncratic or highly unusual AS-related beliefs that might not be assessed in questionnaires. Interoceptive exposure exercises are useful because, unlike questionnaires or interviews, the exercises assess how patients actually think and feel, in real time, when they experience arousal-related bodily sensation. A patient might, for whatever reason, minimize or under-report AS concerns on a questionnaire but experience intense distress and fearful thoughts when bodily sensations are induced via interoceptive exposure. Thus, each of the three methods have their place in the comprehensive assessment of AS.

Self-Report Measures

Agoraphobic Cognitions Questionnaire and Body Sensations Questionnaire

Two scales, the Agoraphobic Cognitions Questionnaire and the Body Sensations Questionnaire (Chambless, Caputo, Bright, & Gallagher, 1984), were developed as measures of fear-of-fear, which was a forerunner to the concept of AS. The Body Sensations Questionnaire asks respondents to rate their fear of each of 17 arousal-related body sensations (e.g., palpitations). The questionnaire has generally performed adequately on various tests of reliability and validity (e.g., Chambless & Gracely, 1989). A limitation of the Body Sensations Questionnaire is that it provides no information on the reasons why the person is frightened of body sensations.

The Agoraphobic Cognitions Questionnaire asks respondents to rate how often each of 14 threat-related thoughts occur when the person is feeling anxious. Examples include thoughts pertaining to physical threat (e.g., "I must have a brain tumor") and those to do with social threat (e.g., "I'm going to act foolish"). The scale has mixed support for its reliability and validity (Taylor, 2000). A further limitation is that its scores are ambiguous. The scale is based on the assumption that high scores indicate a greater tendency to become frightened *by* anxiety; that is, thoughts like "I have a brain tumor" are assumed to be *triggered by* anxiety. However, it might be that the items assess thoughts that *cause* anxiety. The Agoraphobic Cognitions Questionnaire also fails to clearly distinguish thoughts from sensations (Taylor, 2000). That is, scores on the questionnaire are ambiguous. The questionnaire is based on the assumption that higher scores indicate a greater tendency to be frightened *by* anxiety;

for example, items like "I have a brain tumor" are assumed to assess thoughts that are triggered by anxiety. However, it could be that the items actually assess thoughts that *cause* anxiety.

Anxiety Sensitivity Index

High scores on the 16-item self-report scale Anxiety Sensitivity Index (ASI; Reiss, Peterson, Taylor, Schmidt, & Weems, 2008) indicate a strong tendency to catastrophically misinterpret arousal-related body sensations. Moderate scores indicate a tendency to believe these sensations have harmful but not necessarily catastrophic consequences. People with low scores believe that arousal-related sensations are harmless. The ASI has performed well on numerous tests of reliability and validity, and is sensitive to treatment-related effects (Reiss et al., 2008). However, a major limitation is that as a unidimensional measure, it does not delineate the major (i.e., most widely replicated) dimensions of AS; physical, cognitive, and social concerns.

Anxiety Sensitivity Index-3

Several revised versions to the ASI have been developed, with the most widely used version being the 18-item Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007). The ASI-3 consists of three six-item subscales, which assess physical, cognitive, and social concerns. The ASI-3 has good reliability and validity (e.g., Farris et al., 2015; Kemper & Hock, 2017; Rifkin, Beard, Hsu, Garner, & Björgvinsson, 2015). The scale and scoring information are included in the supplemental materials for Taylor et al. (2007).

Other Questionnaires

Several other measures of arousal-related beliefs have been developed, primarily for research purposes, and none have been extensively evaluated in terms of their psychometric properties. Examples of these scales include the Body Sensations Interpretations Questionnaire (Clark et al., 1997) and the Panic Belief Inventory (Wenzel, Sharp, Brown, Greenberg, & Beck, 2006).

Clinical Interview

The assessment of arousal beliefs is not limited to self-report questionnaires. Valuable information can be obtained through a clinical interview, which allows the therapist to collect information on the nature of beliefs about arousal-related sensations, along with information about any environmental events (e.g., learning experiences) that might have contributed to the formation of the beliefs. Among the most useful interview methods for eliciting catastrophic beliefs is the *downward arrow method* (Burns, 1981). This uses a series of questions to identify catastrophic beliefs, including beliefs about the dangerousness of bodily sensations. To use the downward arrow method, the therapist can ask the patient to describe a distressing event, such as a recent episode of panic. Systematic questioning is then used to identify what the

patient regards as the worst part of the event, and why they think that is bad. Questions such as the following are asked:

- "What was most upsetting about _____?"
- "Supposing _____ did happen, why would that be bad?"
- "If _____ was true, what would that mean to you?"
- "What could happen if _____ did occur?"

Interoceptive Exposure Exercises

Interoceptive exposure tasks are a series of exercises that induce arousal-related sensations. These can be performed in the therapist's office for either assessment purposes or therapeutically to challenge catastrophic beliefs about the meaning or consequence(s) of physiological arousal. When used for assessment, they serve as exposure probes. If the patient catastrophically misinterprets the sensations, then a full or limited symptom panic attack would ensue, or the patient would prematurely terminate the exercise. Thus, the probes can be used to assess the patient's interpretations of body sensations in vivo. There are many different interceptive exposure exercises. A list of commonly used exercises appears in Table 4.1. The exercises in Table 4.1 are also used in therapy to test catastrophic beliefs about arousal-related sensations. Some patients have medical conditions (e.g., asthma, epilepsy) that make it unadvisable to use interoceptive exposure (see Table 4.2). Other patients might require slight modifications to otherwise safe interoceptive tasks (e.g., women who are pregnant; Arch, Dimidjian, & Chessick, 2012). If there is any doubt about the safety of a given exercise for a given patient, then either the exercise should not be used or it could be used only after a consultation with the patient's treating physician.

After each exercise is completed, the therapist can ask the patient to rate the intensity of the sensations experiences on a 0-to-10 intensity scale (0 = *absent*, 10 = *maximum intensity*), to list thoughts or images arising during the exercise, and to indicate whether a panic attack occurred. The therapist also can observe whether the patient is attempting to avoid completing the exercise. That is, terminating the task before the allotted time, or trying to avoid the sensations evoked by the task (e.g., by taking shallow breaths during the hyperventilation exercise).

Interoceptive exposure tests are useful for following up on unusually low scores on paper-and-pencil indices of arousal beliefs. To illustrate, consider the case of Edna, who obtained a score of 9 on the ASI-3, which is a score lying in the lower end of the norm range. Yet Edna's descriptions of her panic attacks suggested that the attacks typically occurred because she misinterpreted dizziness as a sign she was about to go crazy. When I raised this possibility with her, she seemed convinced that thoughts had nothing to do with her attacks. To gain further information, I asked Edna to hyperventilate for 1 minute. She began the exercise but stopped after 30 seconds because she was starting to panic. Edna observed that as she

TABLE 4.1. Interoceptive Exposure Exercises

Examples of exercises	Examples of catastrophic beliefs that can be tested*
Shake head rapidly from side to side, or roll head in circles (30 seconds)	"Dizziness leads to insanity."
Place head between knees for 30 seconds and then lift head quickly up to a normal (upright) position	"When I feel lightheaded it means I could be having a stroke."
Spin around while standing up with arms stretched out (1 minute)	"I will throw up if I let myself feel nauseous."
Hold breath (30 seconds)	"Chest tightness means I'm having a heart attack."
Hyperventilate (1 minute)	"If I start to feel unsteady it means I will physically collapse."
Breathe through a narrow straw without breathing through nose (2 minutes)	"Choking sensations are dangerous."
Stare continuously at a ceiling fluorescent light (1 minute)	"If my surroundings start to look weird it means I'm going mad."
Stare continuously at reflection in mirror (2 minutes)	"If I let myself feel spacey I could permanently lose touch with reality."
Stare continuously at spot on wall or at one's hand (3 minutes)	"Feeling unreal is a sign that I'm having a stroke."
Stare for 3 minutes at a visual grid that induces visual illusions (e.g., https://en.wikipedia.org/wiki/Grid_illusion)	"Staring at visual illusions or other unsettling images could tip me over the edge into permanent insanity."
Tense all muscles in body while sitting in a chair (1 minute)	"People will laugh at me if I start to tremble."
Jog on the spot or run up stairs (1 minute)	"I will have a heart attack if my heart starts pounding."
Face a heater, hair dryer, or hand dryer: Heater blowing hot air at the face (5 minutes)	"People will ridicule me if they see I'm having hot flushes."
Tongue depressor: Place tongue depressor at back of throat (30 seconds)	"If my stomach gets upset I'll vomit uncontrollably."
Drink hot coffee (2–3 cups)	"I could go crazy if I get too jittery."
To induce throat tightness, one can ask the patient to start to swallow and then hold the throat in the "mid-swallow" position for 5–10 seconds.	"If my throat feels tight it means I'm about to choke to death."
To induce chest pain, ask the patient to interlock their fingers and place hands behind the head while stretching the elbows backwards. The patient then takes a deep breath and then tries to chest breath at a rate of 1 breath per second for 1 minute.	"Chest pain means I'm having a heart attack."

Note. From *Understanding and Treating Panic Disorder: Cognitive-Behavioural Approaches* (p. 6), by S. Taylor, 2000, New York, NY: Wiley. Copyright 2000 by Wiley and Sons. Reprinted with permission.
*These exercises are also used to test noncatastrophic alternative explanations of the sensations (e.g., "Palpitations are simply due to my lack of physical fitness").

TABLE 4.2. Potential Contraindications for Using Interoceptive Exposure Exercises

Exercise	Potential contraindication
Shake or roll head	Cervical pain or disease (e.g., whiplash injury), history of falling due to dizziness or balance disorder*
Place head between knees and stand up	Postural hypotension, lower-back pain, history of falling due to dizziness or balance disorder*
Spin around	Pregnancy, history of falling due to dizziness or balance disorder*
Hold breath	Chronic obstructive lung disease
Hyperventilate	Chronic obstructive lung disease, severe asthma, cardiac conditions, epilepsy, renal disease, pregnancy
Breathe through a narrow straw	Chronic obstructive pulmonary disease
Stare at fluorescent light	History of seizures caused by staring at flickering lights
Stare at reflection in mirror	No apparent contraindications
Stare at spot on wall or at one's hand	No apparent contraindications
Stare at a visual grid that induces visual illusions	History of seizures or migraine headaches (these can be triggered by the grids)
Tense all muscles	Pain disorders. If pain is localized, patients could tense all but the afflicted region.
Jog on the spot or run up stairs	Cardiac conditions, severe asthma, lower back pain, pregnancy
Heater blowing hot air at face	No apparent contraindications
Tongue depressor at back of throat	Prominent gag reflex (stimulation of which will induce vomiting)
Drink hot coffee	History of severe insomnia
Hold throat in "mid-swallow"	Prominent gag reflex
Hands behind head while stretching elbows backwards	Chronic obstructive pulmonary disease, severe asthma, cardiac conditions, epilepsy, pregnancy, pain disorders. If pain is localized, patients could tense all but the afflicted region.

Note. From *Understanding and Treating Panic Disorder: Cognitive-Behavioural Approaches* (p. 341), by S. Taylor, 2000, New York, NY: Wiley. Copyright 2000 by Wiley and Sons. Reprinted with permission.
*Some forms of vertigo habituate to these exercises.

hyperventilated she had difficulty thinking clearly and became increasingly frightened she was losing control of her mind. This case shows that paper-and-pencil measures are not invariably accurate and that interoceptive probes provide important additional information. Interoceptive exposure probes not only serve as in vivo assessment tools, but also help educate patients about the panic attacks. For example, Edna's experience with the hyperventilation probe led her to conclude that "maybe my thoughts do have an effect on my panic attacks."

CLINICAL IMPLICATIONS

Rationale for Targeting Anxiety Sensitivity in Treatment

If AS is a vulnerability factor for various forms of psychopathology, particularly anxiety disorders and related clinical conditions, then the risk of developing these disorders can be reduced by identifying people with high AS and then encouraging them to complete a brief AS reduction program. To illustrate, military service personnel might be assessed with a measure of AS and those individuals with high scores could be offered an AS-reduction intervention, as a means of reducing the risk of combat-induced anxiety disorders such as PTSD.

For people presenting to tertiary care clinics for treatment of anxiety disorders, an AS-reduction intervention might be an important component of their treatment. AS reduction might not be sufficient to treat all of their presenting problems, but it might play an important role. For example, in the treatment of panic disorder with agoraphobia, AS-reduction exercises (e.g., interoceptive exposure) could be combined with exposure exercises to reduce agoraphobic avoidance (Taylor, 2000). Several different types of transdiagnostic vulnerability factors have been identified, of which AS is one (Boswell et al., 2013; see chapters throughout Part I of this handbook for discussions of other transdiagnostic vulnerability factors). For patients with multiple transdiagnostic vulnerability factors, an intervention for reducing AS might be one of several interventions that are implemented.

Historical Perspective

Historically, the development and implementation of AS-related interventions has proceeded in three overlapping phases. In the first phase, cognitive behavior therapy (CBT) was developed for specific disorders, such as CBT for panic disorder and for other specific disorders (e.g., Clark, 1989). AS reduction exercises—consisting of psychoeducation, cognitive restructuring, and interoceptive exposure, and situational exposure—were included as part of the CBT package for panic disorder. Later, AS reduction exercises were applied to other disorders.

It later became apparent that there were psychological vulnerability factors and interventions that were common to many different kinds of emotional disorders. This led to the development of transdiagnostic forms of CBT (e.g., Barlow et al., 2011; Norton, 2012). As discussed earlier in this chapter, AS is considered to be a transdiagnostic vulnerability factor. Accordingly, interventions for reducing AS were included in transdiagnostic CBT protocols (Boswell et al., 2013).

The third phase involved the development of brief (e.g., one session) interventions that specifically targeted AS. These were developed for people who had high levels of AS but did not necessarily meet diagnostic criteria for a mental disorder. The goal of these programs was preventative, that is, to

reduce the risk of high-AS people developing disorders in the future, such as panic disorder. Meta-analytic research shows that CBT in its various forms, as compared with control conditions, reduces AS, both in treatment-seeking samples (e.g., samples of patients seeking treatment for anxiety disorders) and in prevention studies of at-risk samples (e.g., samples of people with high AS and therefore at risk for developing future psychopathology; Smits, Berry, Tart, & Powers, 2008). Thus, there appears to be both a conceptual and empirical basis for including AS-reduction strategies in prevention and transdiagnostic treatment programs.

Anxiety Sensitivity–Related Interventions as Part of Disorder-Specific Treatment Protocols

AS-reducing interventions were developed for, and extensively investigated with, panic disorder. Researchers are now beginning to investigate how AS interventions can be based applied to other types of disorders.

Panic Disorder

AS reduction interventions were initially used primarily in the treatment of panic disorder. This gradually changed when clinical investigators developed a greater appreciation of the importance of AS in treatment many different disorders. AS-related interventions, as part of CBT for panic disorder, consist of the following: psychoeducation about the nature of AS, cognitive restructuring to correct distorted or maladaptive beliefs about the dangerousness of arousal-related sensations, interoceptive exposure (e.g., voluntary hyperventilation), and naturalistic exposure exercises (e.g., drinking caffeinated beverages to induce rapid heartrate to test mistaken beliefs about the dangerousness of palpitations). Details of these interventions are discussed elsewhere (Taylor, 2000, 2019). This discussion includes a review of ways of enhancing interoceptive exposure by consuming arousal-related but harmless substances (e.g., coffee) and using environmental manipulations (e.g., increasing the heat in the therapist's office) to induce sensations such as flushing and sweating. Essentially all of the AS-reducing interventions used in panic disorder can be used, with modification, in the treatment of other disorders.

Posttraumatic Stress Disorder

Given that AS is elevated in PTSD, this suggests that interoceptive exposure may play a useful role in treating PTSD. That is, interoceptive exposure reduces AS, which in turn was hypothesized to reduce PTSD symptoms (Taylor, 2017). Interoceptive exposure was also hypothesized to facilitate trauma-related exposure (for a description of this form of exposure, see Taylor, 2017). That is, it can be difficult to conduct trauma-related exposure if the person is highly fearful of arousal sensations. Accordingly, by reducing AS it becomes easier for the patient to complete a course of trauma-related exposure. Research from our investigations (e.g., Wald & Taylor, 2008, 2010) and other studies

(reviewed in Taylor, 2017) suggests that interoceptive exposure is useful in the treatment of PTSD. Interoceptive exposure for PTSD proceeds in much the same way as it does for panic disorder. The exception is that for PTSD, interoceptive exposure sometimes triggers trauma-related memories. Examples are as follows (from Wald & Taylor, 2008): In one patient, the breath-holding exercise triggered memories of childhood abuse in which she, as a child, hid in a closet and held her breath, hoping not to be discovered by her drunken, abusive father. Jogging on the spot or running up stairs triggers memories of running away from an abusive parent in another patient. A tongue depressor on the back of the throat triggered memories of being choked during a sexual assault. In such cases, interoceptive exposure would appear to serve a dual purpose: It can directly reduce AS and also enhance the potency of trauma-related exposure therapy to help reduce the patient's distress about trauma-related memories long term (for further details, see Taylor, 2017).

Obsessive-Compulsive Disorder

Little is known about the role and utility of AS-reduction interventions in obsessive-compulsive disorder (OCD). Case reports suggest that interoceptive exposure can play a useful role in the cognitive behavioral treatment of OCD (Blakey & Abramowitz, 2017). For example, interventions targeting the cognitive dyscontrol facet of AS (characterized by beliefs such as, "If my mind races, it means I'm losing control and going crazy") may be useful, especially for patients who worry about acting on their unwanted intrusive thoughts. Interoceptive exercises also can be helpful in reducing distress during exposure therapy for OCD (i.e., exposure and response prevention), as in PTSD treatment.

Social Anxiety Disorder

The AS social-concerns facet can be targeted in the treatment of social anxiety disorder. Many of the interoceptive exposure tasks in Table 4.1 (e.g., hyperventilation) elicit publicly observable anxiety reactions, such as facial flushing and sweating, and evoke distress in people with social anxiety disorder (Dixon, Kemp, Farrell, Blakey, & Deacon, 2015). It is therefore possible that inducing anxious arousal during social anxiety exposures might enhance the ecological validity of such "behavioral experiments" and result in more powerful or durable learning.

Specific Phobias

Case reports suggest that emetophobia (fear of vomiting) can be successfully treated by CBT protocols that include interoceptive exposure exercises that induce gastrointestinal discomfort (e.g., eating beyond feeling full) and other exercises that evoke gastrointestinal, cardiovascular, and respiratory sensations that triggered a patient's fear of vomiting (e.g., hyperventilating, wearing a heavy sweater so that one feels hot; Boettcher, Brake, & Barlow, 2016). Similarly, specific phobia of choking can be treated by using interoceptive

exposure tasks that trigger the gag reflex, such as the use of a tongue depressor, rapid swallowing, or hold swallow in mid-action.

Other Clinical Problems

Interoceptive exposure exercises can be readily adapted and applied to a range of clinical conditions, with the choice of exposure exercises limited only by the therapist's ingenuity. For example, in a case series of patients presenting for treatment of depersonalization, McKay and Moretz (2008) used 3-D glasses to induce depersonalization as an interoceptive exposure exercise. Other interoceptive exercises such as hyperventilation also can produce depersonalization and derealization (Lickel, Nelson, Lickel, & Deacon, 2008).

Interoceptive exposure exercises can similarly be applied to health anxiety and fear of pain, and used in smoking cessation programs in which patients have difficulty tolerating the discomfort associated with withdrawal symptoms (e.g., Walker & Furer, 2008; Zvolensky, Bogiaizian, Salazar, Farris, & Bakhshaie, 2014). Interoceptive exposure can also reduce alcohol consumption in high AS people who drink in order to cope with anxiety (Olthuis, Watt, Mackinnon, & Stewart, 2015).

Transdiagnostic Treatments

A number of transdiagnostic treatment protocols have been developed in which a common protocol is used to treat patients with any of a range of anxiety disorders and comorbid clinical conditions. The rationale is that many different disorders are influenced by transdiagnostic etiological factors (e.g., AS) and that the interventions used to treat these factors (e.g., interoceptive exposure) can therefore be beneficial for a range of clinical conditions, including comorbid cases. The most widely studied transdiagnostic treatment is the Unified Protocol developed by Barlow and colleagues (2011). The protocol, administered individually or in groups, includes interoceptive exposure. The unified protocol, particularly its interoceptive exposure component, leads to a reduction in AS (Boswell et al., 2013). For a range of anxiety disorders, a growing number of treatment studies support the efficacy of this protocol (e.g., Farchione et al., 2012; Reinholt et al., 2017).

Programs Specifically Targeting Anxiety Sensitivity

A number of brief CBT-based programs have been developed for reducing AS, including single-session programs and weekend workshops. The best known, and most intensely studied, of these programs were developed by Schmidt and colleagues (e.g., Keough & Schmidt, 2012; Schmidt, Capron, Raines, & Allan, 2014). These have been shown to be efficacious in reducing AS and in reducing associated distress-related psychopathology, such as the risk for developing anxiety disorders. These investigators have developed several different programs, which differ in details but are consistent in their essential

ingredients of psychoeducation and interoceptive exposure. A screen-and-treatment procedure is adopted; participants are selected for such programs if they have elevated levels of AS, such as scores that were at least 1.5 standard deviations above the mean on the ASI or ASI-3. Selected participants then receive a session of treatment. The intervention may be administered by a clinician or may be largely computer based.

CONCLUSION

This chapter reviewed the theory, research, and practice concerning the treatment of AS—the fear of arousal-related bodily sensations arising from dysfunctional beliefs about the meaning and consequences of these sensations—in anxiety and related disorders. Though conceptually related to other transdiagnostic constructs including distress intolerance (Chapter 6) and experiential avoidance (Chapter 7), substantial empirical work points to the unique role of AS in the development, maintenance, and treatment of anxiety and related conditions. AS can be assessed via self-report measures, clinical interview, and behavioral exercises designed to elicit feared arousal. The recognized importance of AS in treatment planning has led to the development of AS-focused treatment strategies, either as stand-alone interventions or procedures incorporated in multicomponent treatment programs. Fortunately, dysfunctional beliefs about the importance and meaning of anxious arousal may be effectively targeted through the activation of empirically supported treatment mechanisms, as discussed in Part II of this handbook.

REFERENCES

Arch, J. J., Dimidjian, S., & Chessick, C. (2012). Are exposure-based cognitive behavioral therapies safe during pregnancy? *Archives of Women's Mental Health*, *15*, 445–457. http://dx.doi.org/10.1007/s00737-012-0308-9

Barlow, D. H., Farchione, T. J., Fairholme, C. P., Ellard, K. K., Boisseau, C. L., Allen, L. B., & May, J. T. (2011). *Unified protocol for transdiagnostic treatment of emotional disorders*. New York, NY: Oxford University Press.

Bernstein, A., Stickle, T. R., Zvolensky, M. J., Taylor, S., Abramowitz, J., & Stewart, S. (2010). Dimensional, categorical, or dimensional-categories: Testing the latent structure of anxiety sensitivity among adults using factor-mixture modeling. *Behavior Therapy*, *41*, 515–529. http://dx.doi.org/10.1016/j.beth.2010.02.003

Bernstein, A., Zvolensky, M. J., Norton, P. J., Schmidt, N. B., Taylor, S., Forsyth, J. P., . . . Cox, B. (2007). Taxometric and factor analytic models of anxiety sensitivity: Integrating approaches to latent structural research. *Psychological Assessment*, *19*, 74–87. http://dx.doi.org/10.1037/1040-3590.19.1.74

Blakey, S. M., & Abramowitz, J. S. (2017). Interoceptive exposure: An overlooked modality in the cognitive-behavioral treatment of OCD. *Cognitive and Behavioral Practice*, *25*, 145–155.

Boettcher, H., Brake, C. A., & Barlow, D. H. (2016). Origins and outlook of interoceptive exposure. *Journal of Behavior Therapy and Experimental Psychiatry*, *53*, 41–51. http://dx.doi.org/10.1016/j.jbtep.2015.10.009

Boswell, J. F., Farchione, T. J., Sauer-Zavala, S., Murray, H. W., Fortune, M. R., & Barlow, D. H. (2013). Anxiety sensitivity and interoceptive exposure: A transdiagnostic construct and change strategy. *Behavior Therapy*, *44*, 417–431. http://dx.doi.org/10.1016/j.beth.2013.03.006

Brown, H. M., Trzaskowski, M., Zavos, H. M. S., Rijsdijk, F. V., Gregory, A. M., & Eley, T. C. (2012). Phenotypic and genetic structure of anxiety sensitivity in adolescence and early adulthood. *Journal of Anxiety Disorders*, *26*, 680–688. http://dx.doi.org/10.1016/j.janxdis.2012.05.001

Burns, D. D. (1981). *Feeling good: The new mood therapy*. New York, NY: Signet.

Chambless, D. L., Caputo, G. C., Bright, P., & Gallagher, R. (1984). Assessment of fear of fear in agoraphobics: The body sensations questionnaire and the agoraphobic cognitions questionnaire. *Journal of Consulting and Clinical Psychology, 52*, 1090–1097. http://dx.doi.org/10.1037/0022-006X.52.6.1090

Chambless, D. L., & Gracely, E. J. (1989). Fear of fear and the anxiety disorders. *Cognitive Therapy and Research*, *13*, 9–20. http://dx.doi.org/10.1007/BF01178486

Clark, D. M. (1986). A cognitive approach to panic. *Behaviour Research and Therapy*, *24*, 461–470. http://dx.doi.org/10.1016/0005-7967(86)90011-2

Clark, D. M. (1989). Anxiety states: Panic and generalized anxiety. In K. Hawton, P. M. Salkovskis, J. Kirk, & D. M. Clark (Eds.), *Cognitive behaviour therapy for psychiatric problems: A practical guide* (pp. 52–96). New York, NY: Oxford University Press.

Clark, D. M., Salkovskis, P. M., Öst, L.-G., Breitholtz, E., Koehler, K. A., Westling, B. E., . . . Gelder, M. (1997). Misinterpretation of body sensations in panic disorder. *Journal of Consulting and Clinical Psychology*, *65*, 203–213. http://dx.doi.org/10.1037/0022-006X.65.2.203

Dixon, L. J., Kemp, J. J., Farrell, N. R., Blakey, S. M., & Deacon, B. J. (2015). Interoceptive exposure exercises for social anxiety. *Journal of Anxiety Disorders*, *33*, 25–34. http://dx.doi.org/10.1016/j.janxdis.2015.04.006

Farchione, T. J., Fairholme, C. P., Ellard, K. K., Boisseau, C. L., Thompson-Hollands, J., Carl, J. R., . . . Barlow, D. H. (2012). Unified protocol for transdiagnostic treatment of emotional disorders: A randomized controlled trial. *Behavior Therapy*, *43*, 666–678. http://dx.doi.org/10.1016/j.beth.2012.01.001

Farris, S. G., DiBello, A. M., Allan, N. P., Hogan, J., Schmidt, N. B., & Zvolensky, M. J. (2015). Evaluation of the Anxiety Sensitivity Index-3 among treatment-seeking smokers. *Psychological Assessment*, *27*, 1123–1128. http://dx.doi.org/10.1037/pas0000112

Goldstein, A. J., & Chambless, D. L. (1978). A reanalysis of agoraphobia. *Behavior Therapy*, *9*, 47–59. http://dx.doi.org/10.1016/S0005-7894(78)80053-7

Holtz, K., Pané-Farré, C. A., Wendt, J., Lotze, M., & Hamm, A. O. (2012). Brain activation during anticipation of interoceptive threat. *NeuroImage*, *61*, 857–865. http://dx.doi.org/10.1016/j.neuroimage.2012.03.019

Kemper, C. J., & Hock, M. (2017). New evidence on the construct validity of the ASI-3 and the dimensional conceptualization of trait anxiety sensitivity from IRT modeling. *European Journal of Psychological Assessment*, *33*, 181–189.

Keough, M. E., & Schmidt, N. B. (2012). Refinement of a brief anxiety sensitivity reduction intervention. *Journal of Consulting and Clinical Psychology*, *80*, 766–772. http://dx.doi.org/10.1037/a0027961

Knapp, A. A., Frala, J., Blumenthal, H., Badour, C. L., & Leen-Feldner, E. W. (2013). Anxiety sensitivity and childhood learning experiences: Impacts on panic symptoms among adolescents. *Cognitive Therapy and Research*, *37*, 1151–1159. http://dx.doi.org/10.1007/s10608-013-9558-8

Lickel, J., Nelson, E., Lickel, A. H., & Deacon, B. (2008). Interoceptive exposure exercises for evoking depersonalization and derealization: A pilot study. *Journal of Cognitive Psychotherapy*, *22*, 321–330. http://dx.doi.org/10.1891/0889-8391.22.4.321

McKay, D., & Moretz, M. W. (2008). Interoceptive cue exposure for depersonalization: A case series. *Cognitive and Behavioral Practice*, *15*, 435–439. http://dx.doi.org/10.1016/j.cbpra.2008.05.002

Naragon-Gainey, K. (2010). Meta-analysis of the relations of anxiety sensitivity to the depressive and anxiety disorders. *Psychological Bulletin*, *136*, 128–150. http://dx.doi.org/10.1037/a0018055

Norton, P. J. (2012). *Cognitive-behavioral therapy of anxiety: A transdiagnostic treatment manual*. New York, NY: Guilford Press.

Olthuis, J. V., Watt, M. C., Mackinnon, S. P., & Stewart, S. H. (2015). CBT for high anxiety sensitivity: Alcohol outcomes. *Addictive Behaviors*, *46*, 19–24. http://dx.doi.org/10.1016/j.addbeh.2015.02.018

Poletti, S., Radaelli, D., Cucchi, M., Ricci, L., Vai, B., Smeraldi, E., & Benedetti, F. (2015). Neural correlates of anxiety sensitivity in panic disorder: A functional magnetic resonance imaging study. *Psychiatry Research: Neuroimaging*, *233*, 95–101. http://dx.doi.org/10.1016/j.pscychresns.2015.05.013

Reinholt, N., Aharoni, R., Winding, C., Rosenberg, N., Rosenbaum, B., & Arnfred, S. (2017). Transdiagnostic group CBT for anxiety disorders: The unified protocol in mental health services. *Cognitive Behaviour Therapy*, *46*, 29–43. http://dx.doi.org/10.1080/16506073.2016.1227360

Reiss, S., Peterson, R. A., Gursky, D. M., & McNally, R. J. (1986). Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. *Behaviour Research and Therapy*, *24*, 1–8. http://dx.doi.org/10.1016/0005-7967(86)90143-9

Reiss, S., Peterson, R. A., Taylor, S., Schmidt, N., & Weems, C. F. (2008). *Anxiety Sensitivity Index consolidated user manual: ASI, ASI-3, and CASI*. Worthington, OH: IDS.

Rifkin, L. S., Beard, C., Hsu, K. J., Garner, L., & Björgvinsson, T. (2015). Psychometric properties of the anxiety sensitivity index-3 in an acute and heterogeneous treatment sample. *Journal of Anxiety Disorders*, *36*, 99–102. http://dx.doi.org/10.1016/j.janxdis.2015.09.010

Schmidt, N. B., Capron, D. W., Raines, A. M., & Allan, N. P. (2014). Randomized clinical trial evaluating the efficacy of a brief intervention targeting anxiety sensitivity cognitive concerns. *Journal of Consulting and Clinical Psychology*, *82*, 1023–1033. http://dx.doi.org/10.1037/a0036651

Schmidt, N. B., Keough, M. E., Mitchell, M. A., Reynolds, E. K., Macpherson, L., Zvolensky, M. J., & Lejuez, C. W. (2010). Anxiety sensitivity: Prospective prediction of anxiety among early adolescents. *Journal of Anxiety Disorders*, *24*, 503–508. http://dx.doi.org/10.1016/j.janxdis.2010.03.007

Schmidt, N. B., Lerew, D. R., & Jackson, R. J. (1999). Prospective evaluation of anxiety sensitivity in the pathogenesis of panic: Replication and extension. *Journal of Abnormal Psychology*, *108*, 532–537. http://dx.doi.org/10.1037/0021-843X.108.3.532

Smits, J. A. J., Berry, A. C., Tart, C. D., & Powers, M. B. (2008). The efficacy of cognitive-behavioral interventions for reducing anxiety sensitivity: A meta-analytic review. *Behaviour Research and Therapy*, *46*, 1047–1054. http://dx.doi.org/10.1016/j.brat.2008.06.010

Stewart, S. H., Taylor, S., Jang, K. L., Cox, B. J., Watt, M. C., Fedoroff, I. C., & Borger, S. C. (2001). Causal modeling of relations among learning history, anxiety sensitivity, and panic attacks. *Behaviour Research and Therapy*, *39*, 443–456. http://dx.doi.org/10.1016/S0005-7967(00)00023-1

Taylor, S. (2000). *Understanding and treating panic disorder: Cognitive-behavioural approaches*. New York, NY: Wiley.

Taylor, S. (2017). *Clinician's guide to PTSD: Cognitive-behavioral approaches* (2nd ed.). New York, NY: Guilford Press.

Taylor, S. (2019). Treating anxiety sensitivity in adults with anxiety and related disorders. In J. Smits, M. Otto, M. Powers, & S. Baird (Eds.), *Anxiety sensitivity: A clinical guide to assessment and treatment* (pp. 55–75). New York, NY: Elsevier.

Taylor, S., Jang, K. L., Stewart, S. H., & Stein, M. B. (2008). Etiology of the dimensions of anxiety sensitivity: A behavioral-genetic analysis. *Journal of Anxiety Disorders*, *22*, 899–914. http://dx.doi.org/10.1016/j.janxdis.2007.09.005

Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., . . . Cardenas, S. J. (2007). Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3. *Psychological Assessment*, *19*, 176–188. http://dx.doi.org/10.1037/1040-3590.19.2.176

Wald, J., & Taylor, S. (2008). Responses to interoceptive exposure in people with posttraumatic stress disorder (PTSD): A preliminary analysis of induced anxiety reactions and trauma memories and their relationship to anxiety sensitivity and PTSD symptom severity. *Cognitive Behaviour Therapy*, *37*, 90–100. http://dx.doi.org/10.1080/16506070801969054

Wald, J., & Taylor, S. (2010). Implementation and outcome of combining interoceptive exposure with trauma-related exposure therapy in a patient with combat-related posttraumatic stress disorder. *Clinical Case Studies*, *9*, 243–259. http://dx.doi.org/10.1177/1534650110373387

Walker, J. R., & Furer, P. (2008). Interoceptive exposure in the treatment of health anxiety and hypochondriasis. *Journal of Cognitive Psychotherapy*, *22*, 366–378. http://dx.doi.org/10.1891/0889-8391.22.4.366

Wenzel, A., Sharp, I. R., Brown, G. K., Greenberg, R. L., & Beck, A. T. (2006). Dysfunctional beliefs in panic disorder: The Panic Belief Inventory. *Behaviour Research and Therapy*, *44*, 819–833. http://dx.doi.org/10.1016/j.brat.2005.06.001

Zvolensky, M. J., Bogiaizian, D., Salazar, P. L., Farris, S. G., & Bakhshaie, J. (2014). An anxiety sensitivity reduction smoking-cessation program for Spanish-speaking smokers (Argentina). *Cognitive and Behavioral Practice*, *21*, 350–363. http://dx.doi.org/10.1016/j.cbpra.2013.10.005

5

Disgust Sensitivity

Peter J. de Jong and Charmaine Borg

Emma and Olivia were hiking with their dog, Bailey, on their favorite trail in a beautiful and peaceful state park.[1] While enjoying the magnificent views, they suddenly noticed a strong, disgusting smell. After a few more steps, they saw the source of the nasty scent: a dead and partly decomposed deer with maggots crawling in the messy flesh. "Yuck!" Emma exclaimed, while Olivia appeared largely unaffected by the scene. Emma's stomach turned and her face was screwed in disgust while she jerked her head away from the dead deer. When Bailey started to put his snout in the exposed intestines, Emma almost threw up and forced their dog to keep away from the dead animal and follow them along the trail. Upon their return to the parking lot, Emma thoroughly cleaned Bailey before letting him into the car for the drive home.

As exemplified in this vignette, disgust is characterized by intense negative feelings (e.g., aversion) related to a stimulus and an overwhelming urge to avoid or escape the stimulus. Disgust-evoking stimuli may also include objects or people that have been in contact with a disgust elicitor (e.g., Bailey's snout). In the case that someone is unable to avoid a disgusting stimulus, they typically respond with immediate attempts to distance themselves from the stimulus (e.g., wipe off the substance from their skin or clothing) and/or reinstate a sense of cleanliness (e.g., wash, purge the disgusting item that was consumed).

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[1]All clinical case material has been altered to protect patient confidentiality.

This type of response resembles washing compulsions that are characteristic of a subgroup of patients with obsessive-compulsive disorder (OCD), but it can also be observed in the context of individuals with small animal phobia (e.g., wiping hands after contacting a stimulus during exposure-based treatment) or in patients with posttraumatic stress disorder (PTSD; e.g., wash or neutralize thoughts after recalling a sexual assault).

The reflexive tendency to avoid contact with disgusting stimuli also manifests through the characteristic facial expression of disgust (as in the opening vignette). People typically wrinkle up their nose, close their eyes, and raise their upper lip, while turning their head away from the source of disgust—even if only engaging with disgust stimuli within the context of guided mental imagery (e.g., de Jong, Peters, & Vanderhallen, 2002). This highly salient and ingrained facial response not only helps prevent physical contact and (oral) incorporation of disgusting stimuli, but also carries important signal value. For instance, it has been argued that the facial display of disgust is an efficient way to promote the avoidance of hazardous pathogens (e.g., de Jong, 2013; Rozin & Fallon, 1987). Germane to this, there is experimental evidence showing that parents *intensify* their spontaneous facial and vocal disgust responses when disgust elicitors are presented in the presence of their (young) children (Oaten, Stevenson, Wagland, Case, & Repacholi, 2014; Stevenson, Oaten, Case, Repacholi, & Wagland, 2010). These findings seem to indicate that parents attempt to exploit this feature of their disgust response as a means to socialize their children and to teach them to avoid potentially harmful stimuli or behavior. Regardless of the parents' intentions, empirical evidence points to social referencing as a powerful way to render originally neutral stimuli disgusting (Askew, Çakır, Põldsam, & Reynolds, 2014; Gerull & Rapee, 2002). Thus, parental disgust responses are probably an important factor in the acquisition of disgust for particular stimuli and behaviors (Davey, Forster, & Mayhew, 1993; de Jong, 2013).

Irrespective of how we acquire disgust, people vary greatly in their habitual responsiveness to potential disgust elicitors, as was evidenced by Emma and Olivia's differential responding to the dead deer in the opening vignette. Some people are relatively easily disgusted by all kinds of stimuli, whereas others show a relatively high threshold for experiencing disgust (e.g., Olatunji, Sawchuk, de Jong, & Lohr, 2007; W. J. M. van Overveld, de Jong, Peters, Cavanagh, & Davey, 2006). In addition, the concrete stimuli and conditions that elicit disgust are highly variable and show large cross-cultural variation (e.g., Elwood & Olatunji, 2009). Nevertheless, the whole range of disgusting stimuli seems to cluster in three coherent domains (Tybur, Lieberman, & Griskevicius, 2009; Tybur, Lieberman, Kurzban, & DeScioli, 2013): pathogen disgust (e.g., blood, ulcers, saliva), moral disgust (e.g., rape, misuse), and "sexual" disgust (e.g., an unappealing colleague making unwanted sexual advances). Although each form of disgust may be relevant to fear and anxiety problems, this chapter focuses mainly on pathogen disgust.

Pathogen disgust—the most prototypical type of disgust—concerns stimuli such as spoiled food, body products, and deformed body parts. These core

disgust elicitors share common features in that they are all associated with an increased risk of the transmission of infectious diseases. There is broad consensus that this type of disgust can be seen as a defensive mechanism that has evolved to protect the organism from contamination by pathogens and toxins that are invisible to the naked eye but are nevertheless omnipresent in the environment and pose a serious threat to our survival (Curtis, de Barra, & Aunger, 2011). Thus, disgust responses to potentially contaminating stimuli can be conceptualized as a natural and adaptive "first line of defense" designed to protect humans from infectious agents (Curtis et al., 2011; Oaten, Stevenson, & Case, 2009). Consistent with such a disease-avoidance conceptualization, (pathogen) disgust is typically focused on the intersection between the body and the environment and concentrates on the skin and body apertures (Rozin, Nemeroff, Horowitz, Gordon, & Voet, 1995).

Although the functional account of disgust implies disgust has evolved as a disease avoidance mechanism, such an account does not imply that the experience of disgust is always elicited by concerns about the possibility of contracting a dangerous infectious disease. Disgusting stimuli are inherently disgusting, and it is inherent to disgusting stimuli to elicit a strong urge to distance oneself from these stimuli. Therefore, simply providing information indicating that the disgust elicitor is in fact harmless is typically ineffective in modifying evaluations of disgust. To illustrate this point, imagine that you are at a restaurant about to take a sip of soup. Before you can lift out a spoon's worth of soup, the waiter drops three cockroaches in your bowl. What feelings emerge upon the prospect of consuming that soup? What if the waiter explains that these cockroaches have been sterilized and thus carry no harmful bacteria; would you swallow the soup? For people who find cockroaches disgusting, knowing that the cockroaches are not contaminated typically fails to outweigh the urge to reject the soup (which makes perfect sense from the perspective that disgusting stimuli—such as the cockroaches in this example—can be disgusting regardless of their alleged contaminating properties).

CONCEPTUAL IMPLICATIONS

Disgust-based responding has several features that may help explain how disgust might be involved in fear and anxiety (disorders). This section first addresses the "laws" that guide individuals' disgust responding and discusses how insight in these laws may contribute to our understanding of how disgust might contribute to the persistence of fearful preoccupations. The second section explains how disgust and fear may be related and why disgust-based concerns may sometimes give rise to extreme fear. The third section highlights that disgust may not only be elicited by external but also by internal stimuli such as particular images or memories, and it addresses how such "mental disgust" may relate to clinical anxiety.

The "Laws" of Disgust

The perspective that pathogen disgust evolved to protect humans from disease-inflicting stimuli that cannot be seen or otherwise detected may partially explain why disgust is geared toward a *better safe than sorry* heuristic. In case of life or death, it seems wise to play it safe. This adaptive conservatism may also have shaped the two major laws that guide our disgust responding and may therefore be critical for understanding how disgust contributes to the persistence of clinical anxiety, as discussed next.

The first law is known as the *law of similarity*. According to this law, a new stimulus may elicit disgust if it shares some salient features with an already disgusting stimulus. As an example, macaroni may elicit disgust simply because it physically resembles maggots, and people may avoid delicious chocolate just because it is presented in the form of dog feces (Rozin & Fallon, 1987). The law of similarity makes sense from a functional perspective, as it may be the shared features between the "already" and "newly" disgusting stimuli that are critically involved in the transmission of pathogens. However, as its shadow side, this law also promotes the rejection of many "innocent" stimuli and sets the stage for (over)generalization of disgust. The latter may be especially problematic for those with an already low habitual threshold for experiencing disgust.

The second law is known as the *law of contagion*, understood as *once in contact always in contact*. This is reflected in the common finding that a disgusting stimulus (e.g., a spider) can render a perfectly good food item inedible by only brief contact (e.g., Mulkens, de Jong, & Merckelbach, 1996). This second disgust-related "law" also makes sense from a survival perspective. Yet, if for whatever reason "innocent" stimuli have unjustly acquired the status of being contagious, this law will hamper correction. Thus, as an undesirable side effect, this striking feature of disgusting stimuli may contribute further not only to disgust generalization but also to the persistence of the acquired disgust.

Response Overlap Between Disgust and Fear

Most emotions are functionally linked to well-defined motivational goals and corresponding patterns of action tendencies (Frijda, 2006). In the context of pathogen disgust, the ultimate goal of avoiding disease and contamination mirrors the harm-avoidance goal that is associated with fear or anxiety. Yet whereas a state of fear–anxiety makes individuals prone to be vigilant for harm in order to quickly escape a perceived threat (e.g., Lavy, van den Hout, & Arntz, 1993), disgust is typically restricted to eliciting the urge to keep sufficient distance from disgust elicitors to prevent physical contact (e.g., keep a distance from a dirty diaper or decaying animal, as described in the opening vignette). This makes sense from the perspective that most disgust-elicitors are immobile, inanimate stimuli (e.g., spoiled food, human waste, decaying meat) without the ability to show self-initiated approach behavior. Thus, the prototypical disgust-induced avoidance tendencies usually suffice to prevent physical contact with disgust elicitors.

Yet particular conditions heighten the probability of unwanted physical contact with disgust elicitors. For example, if a school field trip involves wildland excursions, stepping in mud or animal droppings may be likely (e.g., Bixler, Carlisle, Hammitt, & Floyd, 1994; Bixler & Floyd, 1999). As another example, someone flying on a cross-country flight may expect to need to use the public toilet at some point during the journey. Especially for those with a low threshold for experiencing disgust, these types of (prospective) conditions may elicit fear or anticipatory anxiety fueled by the prospect of contacting disgusting stimuli.

The perceived probability of unwanted physical contact may also be inflated when the object of disgust can initiate approach behaviors, such as an animal that can freely move (de Jong, Vorage, & van den Hout, 2000). This may be especially the case for animals that can readily enter our private living space such as spiders, mice, and insects. Although individuals' aversion to these animals may be entirely constituted by disgust-related preoccupations, fear may nevertheless be the dominant emotion that people experience and express upon confrontation with such "disgusting" stimuli (e.g., de Jong & Muris, 2002). People may also dread medical procedures when they anticipate that these appointments will involve uncontrollable disgusting procedures or close physical contact with disgusting stimuli (e.g., Reynolds, Consedine, Pizarro, & Bissett, 2013). In a similar vein, the prospect of intimate sexual behaviors may elicit fear in people who consider sex and sexual products as highly disgusting (e.g., Borg, de Jong, & Schultz, 2010). All in all, if common disgust-based avoidance responses do not suffice to avoid contact with a source of disgust, fear seems to become the dominant emotion to promote a timely escape from disgusting cues.

Another clinically relevant distinction between the experience of fear and disgust is the relative rate of decline during prolonged exposure to a disorder-relevant stimulus (e.g., a "dirty" bedpan within the context of contamination fear). Specifically, research has shown that although subjective feelings of disgust decline after some time, the rate of decline in disgust was slower relative to that of anxiety (e.g., Olatunji, Wolitzky-Taylor, Willems, Lohr, & Armstrong, 2009). The apparent refractoriness of disgust may be explained by the relative difficulty to refute the presence of threats that cannot be detected by the naked eye. In line with this, some have argued that disgust may not decline until an individual has gathered several concrete pieces of evidence through personal experience that a stimulus is in fact safe (Bosman, Borg, & de Jong, 2016; de Jong, 2013). Therefore, clinicians and patients should both keep in mind that although disgust may take longer to subside than fear–anxiety, repeated and prolonged physical exposure to aversive stimuli in order to reduce disgust is nevertheless a critical component of treatment.

Disgusting Mental Stimuli

The strong urge to avoid sources of disgust may relate not only to external stimuli but also to internal stimuli such as autobiographical memories. To the

extent that the activation of particular memories elicits disgust (e.g., Emma's memory about coming across a dead deer with maggots crawling in the messy flesh), people are inclined to avoid the retrieval of these specific memories. If such a memory might be triggered by an external cue (e.g., a picture of a deer), the accompanying emotion of disgust might elicit a strong urge to immediately escape and downregulate disgust by resorting to the global level representation (e.g., "I once saw a dead deer" instead of "I once saw a deer carcass with maggots crawling out of it"; cf. Williams et al., 2007). Although the avoidance of and escape from disgusting memories may effectively eliminate the experience of disgust and other distressing emotions, disgust-based avoidance nevertheless obstructs any correction of maladaptive appraisals, thereby contributing to the maintenance of dysfunctional representations or symptoms of clinical anxiety.

ASSESSMENT

When it comes to the assessment of disgust, it is important to differentiate between the concrete disgust response upon confrontation with a particular stimulus or condition (i.e., state disgust) and the more habitual inclination to experience disgust that represents a more general individual characteristic (i.e., trait disgust). In the following section, we describe instruments and measures that can be used to assess both trait and state disgust responding.

Trait Disgust

Several questionnaire measures have been developed to assess individual differences in habitual disgust responsivity. The following sections critically discuss the pros and cons of the most prominent measures of trait disgust, with a separate section devoted to measures adapted to younger age groups.

Disgust Scale—Revised

The 25-item revised version of the Disgust Scale (DS; Haidt, McCauley, & Rozin, 1994) and the further revision with improved scoring format (DS–R; Olatunji, Williams, et al., 2007; M. van Overveld, de Jong, Peters, & Schouten, 2011) are currently the most widely used measures of individual differences in individuals' propensity to experience disgust. Psychometric analyses showed that the range of disgust elicitors represented in the DS–R cluster in three coherent categories (e.g., Olatunji, Williams, et al., 2007; M. van Overveld et al., 2011): Core, Animal Reminder, and Contamination Related. The DS and DS–R have been used in numerous studies examining the relationship between heightened disgust propensity and symptoms of clinical anxiety. These studies showed that Core and Contamination disgust propensity were related to symptoms of obsessive-compulsive disorders (e.g., Olatunji, Williams, et al., 2007), whereas symptoms of blood-injury phobia were more closely related to Animal Reminder disgust propensity (e.g., de Jong & Merckelbach, 1998).

Although both Core and Animal Reminder scores seem to reflect pathogen disgust, these findings suggest that both subtypes of disgust propensity are differentially involved in anxiety related pathology. Thus, elevated disgust propensity for specific types of pathogen disgust may relate to specific types of fears.

Although the DS–R is widely used, it has also some important limitations worth considering. First, half of the questionnaire consists of statements that refer to avoidance of particular stimuli or behaviors that do not explicitly refer to disgust as the underlying driving force. For example, "I might be willing to try eating monkey meat, under some circumstances," or "It would bother me to see a rat run across my path in a park." Although these items may pick up on disgust-induced avoidance, other types of concerns may also drive participant responses. Second, there seems to be conceptual overlap with various measures of anxiety symptoms. For example, items such as "I never let any part of my body touch the toilet seat in a public washroom" may artificially inflate the relationship between disgust propensity and fear of contamination. Similar concerns apply to blood injury phobia or small animal fears.

Three Domain Disgust Scale

Items of the Three Domain Disgust Scale (TDDS; Tybur et al., 2009) assess three theory-derived domains of disgust mentioned earlier in this chapter: pathogen, moral, and sexual disgust. Independent psychometric studies confirmed the proposed three-factor structure of the TDDS (Olatunji et al., 2012). In further support of its validity, other research showed that the pathogen dimension was associated with self-reported OCD symptoms (Olatunji, Ebesutani, & Kim, 2015). One limitation of the TDDS is that it does not differentiate between various types of pathogen-relevant elicitors. On the other hand, a strength is that the TDDS is not restricted to pathogen disgust; it also assesses sexual and moral disgust. This provides the opportunity to test whether the three domains of disgust might be differentially related to various anxiety-related disorders. As one illustration of such research, van Delft, Finkenauer, Tybur, and Lamers-Winkelman (2016) found evidence that heightened sexual disgust propensity (in mothers) was specifically associated with heightened risk for mothers of sexually abused children to develop PTSD (i.e., secondary victimization). As a second drawback, the TDDS (like the DS–R) suffers from conceptual overlap with indices of anxiety psychopathology by including items that are close to those measuring animal phobia or OCD (e.g., "Seeing a cockroach run across the floor" and "Shaking hands with a stranger who has sweaty palms," respectively).

Disgust Propensity and Sensitivity Scale

The Disgust Propensity and Sensitivity Scale (DPSS; W. J. M. van Overveld et al., 2006) was developed to address certain limitations of the DS–R and TDDS. To overcome the problem of conceptual overlap between measures of anxiety psychopathology and disgust propensity, the DPSS measures disgust propensity irrespective of particular elicitors. In addition, the DPSS assesses not only

individual differences in the inclination to experience disgust (i.e., disgust propensity) but also in the appraisal of experiencing disgust (i.e., disgust sensitivity). This distinction is an important and clinically useful one in light of research indicating that clinical anxiety is related not only to how easily people are disgusted but also to how unpleasant the experience of disgust is perceived to be (e.g., W. J. M. van Overveld et al., 2006). Since its initial validation, the DPSS has been revised based on accumulated psychometric research (DPSS–R; Fergus & Valentiner, 2009). The current 12-item DPSS-R has been shown to be a parsimonious and psychometrically sound measure with predictive validity for actual avoidance behavior (e.g., M. van Overveld, de Jong, & Peters, 2010) and symptoms of psychopathology (e.g., Engelhard, Olatunji, & de Jong, 2011). Although the scale was developed as a two-factor measure, there is evidence that a three-factor model provides a better fit with the data (Goetz, Cougle, & Lee, 2013). This third domain seems to reflect ruminative and self-focused disgust and shows a specific association with a measure of obsessional symptoms.

Measures for Youth

The common versions of the DS–R, TDDS, and DPSS–R are not suitable for younger age groups. For assessing (pathogen) disgust in youth, burgeoning work supports using the 30-item Disgust Emotion Scale for Children (Muris et al., 2012), which reliably differentiates five relevant domains of pathogen disgust (animals, injections and blood draws, mutilation and death, rotting foods, and odors). In addition, the 14-item Child Disgust Scale (Viar-Paxton et al., 2015) has been developed as a child-oriented equivalent of the DS–R. Although the Child Disgust Scale showed adequate psychometric properties, it suffers from the same conceptual problem as the original DS–R in that the majority of the items do not explicitly refer to disgust as the underlying driving force.

State Disgust

To evaluate how disgust might be involved in fear and anxiety, it is necessary to consider individual differences in trait disgust and in people's responses to concrete disgust elicitors. The following sections evaluate explicit and implicit measures of state disgust that have (also) been used within the context of phobic fears and anxiety disorders.

Self-Report

An obvious and particularly direct way of assessing disgust is to ask individuals to report their feelings of disgust on a Visual Analogue Scale (Aitken, 1969) ranging from 0 (*absolutely no disgust*) to 100 (*extreme disgust*). This can be done upon actual confrontation with the disgusting stimulus (e.g., Rozin et al., 1995; M. van Overveld et al., 2010), as well as in response to recalling a disgust-eliciting memory or imagining contacting a disgusting stimulus (e.g., de Jong, Andrea, & Muris, 1997; Engelhard et al., 2011). Of course, there might be a

discrepancy between the level of disgust experienced during mere visual exposure to the stimulus and the intensity of the disgust response during (the prospect of) physical contact with the stimulus (e.g., Borg & de Jong, 2012). Following actual or imagined physical contact with the source of disgust, it may also be relevant to ask participants or patients to rate their urge to wash or cleanse themselves as a measure of disgust responding (e.g., Badour, Feldner, Babson, Blumenthal, & Dutton, 2013; Fairbrother, Newth, & Rachman, 2005).

Implicit Assessment

It has been argued that it is important to differentiate between automatic and deliberate affective associations (e.g., Gawronski & Bodenhausen, 2006), as some people may be hesitant to report their true level of disgust in response to a particular stimulus (e.g., sexual intercourse) because of self-presentational concerns or other considerations. Accordingly, several experts have developed indirect performance measures to tap into the automatic affective associations (for a review, see Roefs et al., 2011), although their use might be more feasible in research relative to clinical settings.

A prominent example of implicit assessment is a modification of the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998; see also Bar-Anan & Nosek, 2014; Borg et al., 2010; Huijding & de Jong, 2007; Teachman, Gregg, & Woody, 2001). The Implicit Association Test is essentially a sorting task, wherein respondents are thought to correctly categorize disgusting target words presented on a screen more quickly when required to pair disgust-relevant stimuli (e.g., the words *spider* and *nasty*) than when required to pair disgust-eliciting stimuli with neutral or positive words (e.g., *spider* and *good*). However, the Implicit Association Test is not without its critics (for a compelling analysis of its limitations in measuring automatic associations, see Fiedler, Messner, & Bluemke, 2006), and it generally lacks sufficient sensitivity to be used as a measure of individual differences.

An alternative approach to implicit assessment of disgust is a reaction-time based approach-avoidance task (e.g., Najmi, Kuckertz, & Amir, 2010). In the typical approach-avoidance task, the potential source of disgust is a task-irrelevant feature, and participants are instructed to push or pull a joystick (analogue to approaching or avoiding, respectively) as quickly as possible on the basis of some feature of the visual stimulus. However, as already noted with regard to self-report measures above, this behavioral avoidance may not be uniquely driven by disgust-induced avoidance. These types of concerns also apply to paradigms that use eye movements and fixations as an index of disgust responding (e.g., Armstrong, McClenahan, Kittle, & Olatunji, 2014; Mason & Richardson, 2010), in that although people may typically look away from disgusting cues, looking away does not necessarily imply disgust.

Facial Expression

As mentioned earlier, disgust is associated with a salient and characteristic facial expression. Thus, merely observing people's face during a clinical interview or treatment session when patients discuss or contact potential disgust

elicitors may provide relevant insight to the degree of an individual's disgust level. The intensity of the disgust expression can also be quantified in the context of more controlled exposure to disgust-related stimuli. For example, programs such as FaceReader (2014) can quantify disgust (and other expressions) on the basis of facial recordings. (For a validation of FaceReader, see Lewinski, den Uyl, & Butler, 2014.) However, such facial expression analysis technology may not be practical in routine clinical settings.

Another strategy that has been used to index the facial expression of disgust is the measurement of facial EMG (e.g., de Jong et al., 2002; W. J. M. van Overveld, de Jong, & Peters, 2009; Vrana, 1993). Specifically, the *m. levator labii superioris alesque nasii* that is responsible for the nose wrinkle seems relevant in the context of the specific expression of disgust when confronted with pathogen disgust elicitors. There is some evidence that the *m. levator anguli oris* is involved in responding to moral transgressions (i.e., moral disgust). Contraction of this muscle results in rising of the upper lip; the resulting facial expression seems more closely related to social rejection than to the rejection of bad food (see also Rozin, Lowery, & Ebert, 1994). Although this assessment has its own limitations regarding specificity, it nevertheless carries the advantage of being able to detect subtle disgust responses that go unnoticed by the human eye.

CLINICAL IMPLICATIONS

Disgust-based mechanisms are relevant to many fear- and anxiety-related symptoms and disorders (e.g., Olatunji, Armstrong, & Elwood, 2017; Woody & Teachman, 2000). We next discuss in more detail how disgust-based mechanisms may play a role in the development, expression, and persistence of specific concerns.

Specific Phobias

Most of the initial research on the role of disgust in clinical anxiety and fear predominantly focussed on animal fears (e.g., spider phobia). Matchett and Davey (1991) were the first to propose that small animal phobias may be explained from a disease avoidance perspective, in which disgust plays a central role. They argued that although people with spider phobia often report concerns about spider-related physical harm (e.g., the spider will bite me; Arntz, Lavy, van den Berg, & van Rijsoort, 1993) and respond fearfully to spiders in vivo, these individuals also exhibit patterns of disgust responding. For example, the finding that spider fearful individuals rejected food items that a spider contacted implicated disgust in the experience of spider aversion (de Jong et al., 1997; Mulkens et al., 1996). These types of observations sparked further consideration of how disgust may be involved in specific phobias. Subsequent research indeed showed that the contagious properties of a spider (i.e., an index of subjective disgust) and the perceived probability of

involuntary physical contact were strong predictors of spider fear, whereas perceptions of the spider's ability to cause physical harm added little explanatory value (de Jong & Muris, 2002). Together, these findings corroborate the notion that spider phobia reflects a fear of physical contact with a disgusting stimulus.

Blood, Injection, and Injury Phobias

Heightened disgust appears to be the dominant emotion when people with blood, injection, and injury (BII) fears are exposed to blood-related stimuli (Page, 1994; Tolin, Lohr, Sawchuk, & Lee, 1997). Moreover, people with blood phobia generally exhibit heightened trait disgust sensitivity (e.g., M. van Overveld et al., 2010), thus exacerbating their disgust-related avoidance and responding. Research on individual differences in trait disgust propensity systematically found that BII fears are associated with scores on the Animal Reminder subscale of the DS(–R), but not the Core disgust subscale (e.g., de Jong & Merckelbach, 1998; Olatunji, Sawchuk, de Jong, & Lohr, 2006). In other words, BII fears seem to reflect an inclination to respond with disgust to body-related pathogen-disgust-relevant stimuli in particular.

For some people with BII phobia, fear is predominantly focused on injections and related medical procedures. Fear of injections appears to be driven by two components: one related to features of uncontrollability regarding the medical procedure and a second component related to disgust (envelope violation and blood). Of course, some people may fear the pain or harm associated with an injection, which can overshadow concerns about envelope violation and/or blood (e.g., Trijsburg et al., 1996). The persistence of BII phobia may thus be promoted by biased judgments about the uncontrollability of the medical procedure and its consequences, as well as by inflated disgust responding.

Obsessive-Compulsive Disorder

There is consistent evidence that people with greater contamination fear and washing compulsions show a generally enhanced responsivity to potential disgust elicitors and score higher on measures assessing contamination-related disgust (e.g., Olatunji, Sawchuk, Lohr, & de Jong, 2004; Olatunji, Williams, et al., 2007). Perhaps unsurprisingly, available research indicates that sources of disgust that carry a high threat of contagion are most strongly linked to contamination fears as observed in individuals with OCD. There is also evidence that patients with OCD are especially sensitive to the mere prospect of contamination. The creative "contagious pencil" experiment (see Tolin, Worhunsky, & Maltby, 2004) is a striking illustration of how the disgusting quality of particular contamination-relevant stimuli can be persistently transferred to other stimuli among patients with OCD, which may result in a highly invalidating over-generalization of disgust elicitors. In this experiment, participants were first asked to identify "the most contaminated object in this building." Most participants selected objects such as a toilet or garbage can.

Then a brand new pencil was unpacked and thoroughly brushed along "the most contaminated object." Subsequently, participants were asked to indicate the contaminating properties of the pencil. Next, a second pencil was unpacked and thoroughly brushed along the "contaminated" (first) pencil; again, participants then rated the pencil's contaminating properties. This procedure of unpacking and thoroughly brushing new pencils against the most recently "contaminated" pencil was repeated several times. For participants without OCD, contamination ratings gradually declined during this repeated procedure and were about zero from the seventh pencil onwards. In contrast, ratings provided by participants with OCD showed a tendency to stabilize; even after 12 pencils, these participants still reported contamination ratings well above 50 on a 100-point scale. This heightened perceived probability of contamination ("once in contact always in contact") may thus help explain the development and persistence of generalized disgust-induced avoidance in contamination-based OCD.

One crucial question is why patients with OCD maintain their position that even "innocent" disgusting stimuli should be avoided. One possible explanation is that people with OCD use their feelings of disgust as information. Indeed, it has been shown that individuals with fear of contamination are inclined to infer contamination or physical threat (illness) on the basis of their subjective disgust response (i.e., "if I feel disgust, it must be contagious"; Verwoerd, de Jong, Wessel, & van Hout, 2013). Thus, people with contamination-related OCD not only more rapidly experience disgust, but are also more inclined to use these feelings of disgust as evidence for the threat value of the disgust elicitor. Such tendency to avoid potential contamination on the basis of disgust-based emotional reasoning may serve to confirm and reinforce mistaken disgust-related catastrophic beliefs (see Chapter 2). It might therefore be important for clinicians to assess for whether disgust and disgust-based reasoning should be incorporated into a contamination-fearful patient's case conceptualization and treatment plan.

Posttraumatic Stress Disorder

There is increasing appreciation for the potential role of disgust in PTSD (for a review, see Badour & Feldner, 2018). Pointing to the relevance of disgust in the development and persistence of PTSD, Foy, Sipprelle, Rueger, and Carroll (1984) previously described that persistent feelings of disgust were quite common among Vietnam veterans and showed predictive value for the development of PTSD. More recent research indicates that disgust is the primary emotion for approximately 10% of patients with PTSD (Power & Fyvie, 2013). Many traumatic events, including combat experiences and sexual assault, share features that may elicit disgust. Indeed, people with combat-related trauma experiences report peritraumatic disgust in addition to peritraumatic fear (e.g., Engelhard et al., 2011). Similar findings have been reported for women who developed PTSD following sexual assault (e.g., Badour et al., 2013).

It seems reasonable to assume that people with stronger disgust propensity would be at risk for experiencing elevated peritraumatic disgust. Indeed, the

level of retrospectively rated peritraumatic disgust following combat experiences in Afghanistan was higher in soldiers with higher scores on the DS–R Animal Reminder subscale (Engelhard et al., 2011). Interestingly, the relationship between the strength of peritraumatic disgust and the level of PTSD symptomatology was moderated by disgust sensitivity as indexed by the DPSS–R. Specifically, the relationship between peritraumatic disgust and PTSD symptoms were stronger among those with greater disgust sensitivity. To the extent that activating a specific trauma memory elicits disgust, people are typically inclined to avoid all cues that may elicit this memory. The urge to avoid these types of disgust-eliciting memories would be especially strong in people with high disgust sensitivity because of their particularly negative appreciation of the experience of disgust. Thus, high disgust sensitivity may promote disgust-based avoidance of specific (trauma) memories, thereby obstructing any correction of maladaptive appraisals and associated distress. More generally, urges to avoid traumatic memories that elicit disgust may not only contribute to the persistence of PTSD, but also hamper the efficacy of exposure-based PTSD treatments. Thus, clinicians should consider incorporating strategies that target PTSD-related disgust (e.g., "conceptual reorientation"; see Jung & Steil, 2013; Rozin & Fallon, 1987).

CONCLUSION

There is increasing evidence that disgust-based mechanisms are important to the development, maintenance, and treatment of clinical anxiety. Paradoxically, effective disgust-motivated avoidance may also obscure the relevance of disgust-based underpinnings of anxiety- and fear-related disorders, because such clinically significant disgust may only be recognized to the extent that people are exposed to disgust-evoking stimuli that they habitually avoid. That disgust evolved as a mechanism to prevent contamination by invisible stimuli may not only help explain why disgust is relatively resistant to disconfirmatory evidence, but also why many individuals engage in emotional reasoning and other types of dysfunctional attributional processes that sustain the disgust responses (e.g., Verwoerd, van Hout, & de Jong, 2016). All in all, there is ample evidence that disgust (and disgust-based mechanisms) should be incorporated into cognitive behavioral conceptualizations of clinical anxiety and related disorders. Doing so may not only help to improve our understanding of the processes involved in the persistence of fear and anxiety problems but also highlight promising directions for future research that could improve currently available treatment options.

REFERENCES

Aitken, R. C. B. (1969). Measurement of feeling using visual analogue scales. *Proceedings of the Royal Society of Medicine*, *62*, 989–993.

Armstrong, T., McClenahan, L., Kittle, J., & Olatunji, B. O. (2014). Don't look now! Oculomotor avoidance as a conditioned disgust response. *Emotion*, *14*, 95–104. http://dx.doi.org/10.1037/a0034558

Arntz, A., Lavy, E., van den Berg, G., & van Rijsoort, S. (1993). Negative beliefs of spider phobics: A psychometric evaluation of the Spider Phobia Beliefs Questionnaire. *Advances in Behaviour Research and Therapy*, *15*, 257–277. http://dx.doi.org/10.1016/0146-6402(93)90012-Q

Askew, C., Çakır, K., Põldsam, L., & Reynolds, G. (2014). The effect of disgust and fear modeling on children's disgust and fear for animals. *Journal of Abnormal Psychology*, *123*, 566–577. http://dx.doi.org/10.1037/a0037228

Badour, C. L., & Feldner, M. T. (2018). The role of disgust in posttraumatic stress: A critical review of the empirical literature. *Journal of Experimental Psychopathology, 3*, 1–26.

Badour, C. L., Feldner, M. T., Babson, K. A., Blumenthal, H., & Dutton, C. E. (2013). Disgust, mental contamination, and posttraumatic stress: Unique relations following sexual versus non-sexual assault. *Journal of Anxiety Disorders*, *27*, 155–162. http://dx.doi.org/10.1016/j.janxdis.2012.11.002

Bar-Anan, Y., & Nosek, B. A. (2014). A comparative investigation of seven indirect attitude measures. *Behavior Research Methods*, *46*, 668–688. http://dx.doi.org/10.3758/s13428-013-0410-6

Bixler, R. D., Carlisle, C. L., Hammitt, W. E., & Floyd, M. F. (1994). Observed fears and discomforts among urban students on field trips to wildland areas. *The Journal of Environmental Education, 26*, 24–33. http://dx.doi.org/10.1080/00958964.1994.9941430

Bixler, R. D., & Floyd, M. F. (1999). Hands on or hands off? Disgust sensitivity and preference for environmental education activities. *The Journal of Environmental Education*, *30*, 4–11. http://dx.doi.org/10.1080/00958969909601871

Borg, C., & de Jong, P. J. (2012). Feelings of disgust and disgust-induced avoidance weaken following induced sexual arousal in women. *PLoS One*, *7*, e44111. http://dx.doi.org/10.1371/journal.pone.0044111

Borg, C., de Jong, P. J., & Schultz, W. W. (2010). Vaginismus and dyspareunia: Automatic vs. deliberate disgust responsivity. *Journal of Sexual Medicine*, *7*, 2149–2157. http://dx.doi.org/10.1111/j.1743-6109.2010.01800.x

Bosman, R. C., Borg, C., & de Jong, P. J. (2016). Optimizing extinction of conditioned disgust. *PLoS One*, *11*, e0148626. http://dx.doi.org/10.1371/journal.pone.0148626

Curtis, V., de Barra, M., & Aunger, R. (2011). Disgust as an adaptive system for disease avoidance behaviour. *Philosophical Transactions of the Royal Society of London: Series B. Biological Sciences*, *366*, 389–401. http://dx.doi.org/10.1098/rstb.2010.0117

Davey, G. C. L., Forster, L., & Mayhew, G. (1993). Familial resemblances in disgust sensitivity and animal phobias. *Behaviour Research and Therapy*, *31*, 41–50. http://dx.doi.org/10.1016/0005-7967(93)90041-R

de Jong, P. J. (2013). Learning mechanisms in the acquisition of disgust. In D. Hermans, B. Rimé & B. Mesquita (Eds.), *Changing emotions* (pp. 74–80). London, England: Psychology Press.

de Jong, P. J., Andrea, H., & Muris, P. (1997). Spider phobia in children: Disgust and fear before and after treatment. *Behaviour Research and Therapy*, *35*, 559–562. http://dx.doi.org/10.1016/S0005-7967(97)00002-8

de Jong, P. J., & Merckelbach, H. (1998). Blood-injection-injury phobia and fear of spiders: Domain specific individual differences in disgust sensitivity. *Personality and Individual Differences*, *24*, 153–158. http://dx.doi.org/10.1016/S0191-8869(97)00178-5

de Jong, P. J., & Muris, P. (2002). Spider phobia: Interaction of disgust and perceived likelihood of involuntary physical contact. *Journal of Anxiety Disorders*, *16*, 51–65. http://dx.doi.org/10.1016/S0887-6185(01)00089-5

de Jong, P. J., Peters, M., & Vanderhallen, I. (2002). Disgust and disgust sensitivity in spider phobia: Facial EMG in response to spider and oral disgust imagery. *Journal of Anxiety Disorders*, *16*, 477–493. http://dx.doi.org/10.1016/S0887-6185(02)00167-6

de Jong, P. J., Vorage, I., & van den Hout, M. A. (2000). Counterconditioning in the treatment of spider phobia: Effects on disgust, fear and valence. *Behaviour Research and Therapy*, *38*, 1055–1069. http://dx.doi.org/10.1016/S0005-7967(99)00135-7

Elwood, L. S., & Olatunji, B. O. (2009). A cross-cultural perspective on disgust. In B. Olatunji & D. McKay (Eds.), *Disgust and its disorders: Theory, assessment, and treatment* (pp. 99–122). Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/11856-005

Engelhard, I. M., Olatunji, B. O., & de Jong, P. J. (2011). Disgust and the development of posttraumatic stress among soldiers deployed to Afghanistan. *Journal of Anxiety Disorders, 25,* 58–63. http://dx.doi.org/10.1016/j.janxdis.2010.08.003

FaceReader (Version 6.0) [Computer software]. (2014). Wageningen, the Netherlands: Noldus Information Technology B.V.

Fairbrother, N., Newth, S. J., & Rachman, S. (2005). Mental pollution: Feelings of dirtiness without physical contact. *Behaviour Research and Therapy, 43,* 121–130. http://dx.doi.org/10.1016/j.brat.2003.12.005

Fergus, T. A., & Valentiner, D. P. (2009). The Disgust Propensity and Sensitivity Scale–Revised: An examination of a reduced-item version. *Journal of Anxiety Disorders, 23,* 703–710. http://dx.doi.org/10.1016/j.janxdis.2009.02.009

Fiedler, K., Messner, C., & Bluemke, M. (2006). Unresolved problems with the "I," the "A," and the "T": A logical and psychometric critique of the Implicit Association Test (IAT). *European Review of Social Psychology, 17,* 74–147. http://dx.doi.org/10.1080/10463280600681248

Foy, D. W., Sipprelle, R. C., Rueger, D. B., & Carroll, E. M. (1984). Etiology of posttraumatic stress disorder in Vietnam veterans: Analysis of premilitary, military, and combat exposure influences. *Journal of Consulting and Clinical Psychology, 52,* 79–87. http://dx.doi.org/10.1037/0022-006X.52.1.79

Frijda, N. H. (2006). *The laws of emotion.* Mahwah, NJ: Erlbaum.

Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin, 132,* 692–731. http://dx.doi.org/10.1037/0033-2909.132.5.692

Gerull, F. C., & Rapee, R. M. (2002). Mother knows best: Effects of maternal modelling on the acquisition of fear and avoidance behaviour in toddlers. *Behaviour Research and Therapy, 40,* 279–287. http://dx.doi.org/10.1016/S0005-7967(01)00013-4

Goetz, A. R., Cougle, J. R., & Lee, H. J. (2013). Revisiting the factor structure of the 12-item Disgust Propensity and Sensitivity Scale—Revised: Evidence for a third component. *Personality and Individual Differences, 55,* 579–584. http://dx.doi.org/10.1016/j.paid.2013.04.029

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74,* 1464–1480. http://dx.doi.org/10.1037/0022-3514.74.6.1464

Haidt, J., McCauley, C., & Rozin, P. (1994). Individual differences in sensitivity to disgust: A scale sampling seven domains of disgust elicitors. *Personality and Individual Differences, 16,* 701–713. http://dx.doi.org/10.1016/0191-8869(94)90212-7

Huijding, J., & de Jong, P. J. (2007). Beyond fear and disgust: The role of (automatic) contamination-related associations in spider phobia. *Journal of Behavior Therapy and Experimental Psychiatry, 38,* 200–211. http://dx.doi.org/10.1016/j.jbtep.2006.10.009

Jung, K., & Steil, R. (2013). A randomized controlled trial on cognitive restructuring and imagery modification to reduce the feeling of being contaminated in adult survivors of childhood sexual abuse suffering from posttraumatic stress disorder. *Psychotherapy and Psychosomatics, 82,* 213–220. http://dx.doi.org/10.1159/000348450

Lavy, E., van den Hout, M., & Arntz, A. (1993). Attentional bias and facilitated escape: A pictorial test. *Advances in Behaviour Research and Therapy, 15,* 279–289. http://dx.doi.org/10.1016/0146-6402(93)90013-R

Lewinski, P., den Uyl, T. M., & Butler, C. (2014). Automated facial coding: Validation of basic emotions and FACS AUs in FaceReader. *Journal of Neuroscience, Psychology, and Economics, 7,* 227–236. http://dx.doi.org/10.1037/npe0000028

Mason, E. C., & Richardson, R. (2010). Looking beyond fear: The extinction of other emotions implicated in anxiety disorders. *Journal of Anxiety Disorders*, *24*, 63–70. http://dx.doi.org/10.1016/j.janxdis.2009.08.007

Matchett, G., & Davey, G. C. L. (1991). A test of a disease-avoidance model of animal phobias. *Behaviour Research and Therapy*, *29*, 91–94. http://dx.doi.org/10.1016/S0005-7967(09)80011-9

Mulkens, S. A., de Jong, P. J., & Merckelbach, H. (1996). Disgust and spider phobia. *Journal of Abnormal Psychology*, *105*, 464–468. http://dx.doi.org/10.1037/0021-843X.105.3.464

Muris, P., Huijding, J., Mayer, B., Langkamp, M., Reyhan, E., & Olatunji, B. (2012). Assessment of disgust sensitivity in children with an age-downward version of the Disgust Emotion Scale. *Behavior Therapy*, *43*, 876–886. http://dx.doi.org/10.1016/j.beth.2012.03.002

Najmi, S., Kuckertz, J. M., & Amir, N. (2010). Automatic avoidance tendencies in individuals with contamination-related obsessive-compulsive symptoms. *Behaviour Research and Therapy*, *48*, 1058–1062. http://dx.doi.org/10.1016/j.brat.2010.06.007

Oaten, M., Stevenson, R. J., & Case, T. I. (2009). Disgust as a disease-avoidance mechanism. *Psychological Bulletin*, *135*, 303–321. http://dx.doi.org/10.1037/a0014823

Oaten, M., Stevenson, R. J., Wagland, P., Case, T. I., & Repacholi, B. M. (2014). Parent–child transmission of disgust and hand hygiene: The role of vocalizations, gestures and other parental responses. *The Psychological Record*, *64*, 803–811. http://dx.doi.org/10.1007/s40732-014-0044-9

Olatunji, B. O., Adams, T., Ciesielski, B., David, B., Sarawgi, S., & Broman-Fulks, J. (2012). The Three Domains of Disgust Scale: Factor structure, psychometric properties, and conceptual limitations. *Assessment*, *19*, 205–225. http://dx.doi.org/10.1177/1073191111432881

Olatunji, B. O., Armstrong, T., & Elwood, L. (2017). Is disgust proneness associated with anxiety and related disorders? A qualitative review and meta-analysis of group comparison and correlational studies. *Perspectives on Psychological Science*, *12*, 613–648. http://dx.doi.org/10.1177/1745691616688879

Olatunji, B. O., Ebesutani, C., & Kim, E. H. (2015). Examination of a bifactor model of the Three Domains of Disgust Scale: Specificity in relation to obsessive-compulsive symptoms. *Psychological Assessment*, *27*, 102–113. http://dx.doi.org/10.1037/pas0000039

Olatunji, B. O., Sawchuk, C. N., de Jong, P. J., & Lohr, J. M. (2006). The structural relation between disgust sensitivity and blood–injection–injury fears: A cross-cultural comparison of US and Dutch data. *Journal of Behavior Therapy and Experimental Psychiatry*, *37*, 16–29. http://dx.doi.org/10.1016/j.jbtep.2005.09.002

Olatunji, B. O., Sawchuk, C. N., de Jong, P. J., & Lohr, J. M. (2007). Disgust sensitivity and anxiety disorder symptoms: Psychometric properties of the disgust emotion scale. *Journal of Psychopathology and Behavioral Assessment*, *29*, 115–124. http://dx.doi.org/10.1007/s10862-006-9027-8

Olatunji, B. O., Sawchuk, C. N., Lohr, J. M., & de Jong, P. J. (2004). Disgust domains in the prediction of contamination fear. *Behaviour Research and Therapy*, *42*, 93–104. http://dx.doi.org/10.1016/S0005-7967(03)00102-5

Olatunji, B. O., Williams, N. L., Tolin, D. F., Abramowitz, J. S., Sawchuk, C. N., Lohr, J. M., & Elwood, L. S. (2007). The Disgust Scale: Item analysis, factor structure, and suggestions for refinement. *Psychological Assessment*, *19*, 281–297. http://dx.doi.org/10.1037/1040-3590.19.3.281

Olatunji, B. O., Wolitzky-Taylor, K. B., Willems, J., Lohr, J. M., & Armstrong, T. (2009). Differential habituation of fear and disgust during repeated exposure to threat-relevant stimuli in contamination-based OCD: An analogue study. *Journal of Anxiety Disorders*, *23*, 118–123. http://dx.doi.org/10.1016/j.janxdis.2008.04.006

Page, A. C. (1994). Blood-injury phobia. *Clinical Psychology Review*, *14*, 443–461. http://dx.doi.org/10.1016/0272-7358(94)90036-1

Power, M. J., & Fyvie, C. (2013). The role of emotion in PTSD: Two preliminary studies. *Behavioural and Cognitive Psychotherapy*, *41*, 162–172. http://dx.doi.org/10.1017/S1352465812000148

Reynolds, L. M., Consedine, N. S., Pizarro, D. A., & Bissett, I. P. (2013). Disgust and behavioral avoidance in colorectal cancer screening and treatment: A systematic review and research agenda. *Cancer Nursing*, *36*, 122–130. http://dx.doi.org/10.1097/NCC.0b013e31826a4b1b

Roefs, A., Huijding, J., Smulders, F. T. Y., MacLeod, C. M., de Jong, P. J., Wiers, R. W., & Jansen, A. T. M. (2011). Implicit measures of association in psychopathology research. *Psychological Bulletin*, *137*, 149–193. http://dx.doi.org/10.1037/a0021729

Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Review*, *94*, 23–41. http://dx.doi.org/10.1037/0033-295X.94.1.23

Rozin, P., Lowery, L., & Ebert, R. (1994). Varieties of disgust faces and the structure of disgust. *Journal of Personality and Social Psychology*, *66*, 870–881. http://dx.doi.org/10.1037/0022-3514.66.5.870

Rozin, P., Nemeroff, C., Horowitz, M., Gordon, B., & Voet, W. (1995). The borders of the self: Contamination sensitivity and potency of the body apertures and other body parts. *Journal of Research in Personality*, *29*, 318–340. http://dx.doi.org/10.1006/jrpe.1995.1019

Stevenson, R. J., Oaten, M. J., Case, T. I., Repacholi, B. M., & Wagland, P. (2010). Children's response to adult disgust elicitors: Development and acquisition. *Developmental Psychology*, *46*, 165–177. http://dx.doi.org/10.1037/a0016692

Teachman, B. A., Gregg, A. P., & Woody, S. R. (2001). Implicit associations for fear-relevant stimuli among individuals with snake and spider fears. *Journal of Abnormal Psychology*, *110*, 226–235. http://dx.doi.org/10.1037/0021-843X.110.2.226

Tolin, D. F., Lohr, J. M., Sawchuk, C. N., & Lee, T. C. (1997). Disgust and disgust sensitivity in blood-injection-injury and spider phobia. *Behaviour Research and Therapy*, *35*, 949–953. http://dx.doi.org/10.1016/S0005-7967(97)00048-X

Tolin, D. F., Worhunsky, P., & Maltby, N. (2004). Sympathetic magic in contamination-related OCD. *Journal of Behavior Therapy and Experimental Psychiatry*, *35*, 193–205. http://dx.doi.org/10.1016/j.jbtep.2004.04.009

Trijsburg, R. W., Jelicic, M., van den Broek, W. W., Plekker, A. E. M., Verheij, R., & Passchier, J. (1996). Exposure and participant modelling in a case of injection phobia. *Psychotherapy and Psychosomatics*, *65*, 57–61. http://dx.doi.org/10.1159/000289033

Tybur, J. M., Lieberman, D., & Griskevicius, V. (2009). Microbes, mating, and morality: Individual differences in three functional domains of disgust. *Journal of Personality and Social Psychology*, *97*, 103–122. http://dx.doi.org/10.1037/a0015474

Tybur, J. M., Lieberman, D., Kurzban, R., & DeScioli, P. (2013). Disgust: Evolved function and structure. *Psychological Review*, *120*, 65–84. http://dx.doi.org/10.1037/a0030778

van Delft, I., Finkenauer, C., Tybur, J. M., & Lamers-Winkelman, F. (2016). Disgusted by sexual abuse: Exploring the association between disgust sensitivity and post-traumatic stress symptoms among mothers of sexually abused children. *Journal of Traumatic Stress*, *29*, 237–244. http://dx.doi.org/10.1002/jts.22099

van Overveld, W. J. M., de Jong, P. J., & Peters, M. L. (2009). Digestive and cardio-vascular responses to core and animal-reminder disgust. *Biological Psychology*, *80*, 149–157. http://dx.doi.org/10.1016/j.biopsycho.2008.08.002

van Overveld, M., de Jong, P. J., & Peters, M. L. (2010). The Disgust Propensity and Sensitivity Scale—Revised: Its predictive value for avoidance behavior. *Personality and Individual Differences*, *49*, 706–711. http://dx.doi.org/10.1016/j.paid.2010.06.008

van Overveld, W. J. M., de Jong, P. J., Peters, M. L., Cavanagh, K., & Davey, G. C. L. (2006). Disgust propensity and disgust sensitivity: Separate constructs that are differentially related to specific fears. *Personality and Individual Differences*, *41*, 1241–1252. http://dx.doi.org/10.1016/j.paid.2006.04.021

van Overveld, M., de Jong, P. J., Peters, M. L., & Schouten, E. (2011). The Disgust Scale–R: A valid and reliable index to investigate separate disgust domains? *Personality and Individual Differences*, *51*, 325–330. http://dx.doi.org/10.1016/j.paid.2011.03.023

Verwoerd, J., de Jong, P. J., Wessel, I., & van Hout, W. J. P. J. (2013). "If I feel disgusted, I must be getting ill": Emotional reasoning in the context of contamination fear. *Behaviour Research and Therapy*, *51*, 122–127. http://dx.doi.org/10.1016/j.brat.2012.11.005

Verwoerd, J., van Hout, W. J. P. J., & de Jong, P. J. (2016). Disgust- and anxiety-based emotional reasoning in non-clinical fear of vomiting. *Journal of Behavior Therapy and Experimental Psychiatry*, *50*, 83–89. http://dx.doi.org/10.1016/j.jbtep.2015.05.009

Viar-Paxton, M. A., Ebesutani, C., Kim, E. H., Ollendick, T., Young, J., & Olatunji, B. O. (2015). Development and initial validation of the Child Disgust Scale. *Psychological Assessment*, *27*, 1082–1096. http://dx.doi.org/10.1037/a0038925

Vrana, S. R. (1993). The psychophysiology of disgust: Differentiating negative emotional contexts with facial EMG. *Psychophysiology*, *30*, 279–286. http://dx.doi.org/10.1111/j.1469-8986.1993.tb03354.x

Williams, J. M., Barnhofer, T., Crane, C., Herman, D., Raes, F., Watkins, E., & Dalgleish, T. (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin*, *133*, 122–148. http://dx.doi.org/10.1037/0033-2909.133.1.122

Woody, S. R., & Teachman, B. A. (2000). Intersection of disgust and fear: Normative and pathological views. *Clinical Psychology: Science and Practice*, *7*, 291–311. http://dx.doi.org/10.1093/clipsy.7.3.291

6

Distress Intolerance

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Irma was a business student who hoped to get a job as a marketing consultant upon finishing her degree. Although she was genuinely interested in her major, she found her classes extremely distressing, in part because of the required presentations. Irma worried that others would evaluate her negatively, but more specifically, she felt incapable of handling the "intolerable and unmanageable" stress associated with speaking to a group. Irma disliked the physical sensations that accompanied public speaking, but these did not bother her as much as the idea of having to endure strong negative emotions. Irma noted that while she generally disliked feeling upset or stressed, this tendency was particularly pronounced for public speaking. To cope, Irma offered to do all of the preparatory work for group presentations, leaving the public speaking to her classmates despite positive feedback from her peers and instructors on her performance. Though Irma's role during presentations was limited, she would spend the entire class helplessly focused on how awful she felt, finding the experience overwhelming and unbearable. Irma would express shame that presentations caused her so much distress and anxiety. Eventually, she changed her major to accounting, which was less of an interest to her but did not involve public speaking. This gave her an immediate sense of relief; however, when Irma thinks about the business major she dropped, she experiences significant guilt and regret.[1]

Irma's cognitions, emotions, and behaviors highlight the impact of distress intolerance on the evaluation of negative emotional states and subsequent reactions to experiencing distressing situations (Schmidt, Mitchell, Keough, & Riccardi, 2011). Distress intolerance is an individual difference factor that

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[1]All clinical case material has been altered to protect patient confidentiality.

varies dimensionally across the population (Schmidt et al., 2011). Notably, an individual's perceived and actual ability to tolerate stressors may not align (Bernstein, Marshall, & Zvolensky, 2011). Distress intolerance can also vary according to emotional domain (Geisser, Robinson, & Pickren, 1992; Simons & Gaher, 2005) and across situations, which reflects the multifaceted nature of this cognitive risk factor. Whereas the *content* and *nature* of distress may vary across disorders and individuals, the *process* of having difficulty tolerating distress may signal a transdiagnostic vulnerability for psychopathology.

Irma's distress intolerance influences (a) her *anticipatory beliefs* in her ability to tolerate a stressor and her prediction of how distressing it will be, (b) her *experience* of distress, and (c) her *coping behaviors* surrounding the event (Simons & Gaher, 2005). Illustrating the anticipatory aspect of distress intolerance, Irma's anxiety prior to the presentation is associated with negative beliefs about herself (e.g., "I can't handle public speaking") and the future (e.g., "I will freeze and forget what to say"). Irma envisions herself doing poorly at the presentation, and she expects to be unable to navigate the negative emotions sparked by the experience. Her anticipatory beliefs influence her real-time appraisals of the situation as threatening and unbearable. Individuals with low distress tolerance may allocate greater attentional resources to negative emotional states (Schmidt et al., 2011), which in Irma's case includes her stress level, anxious thoughts, and physical sensations. By directing focus to the most distressing parts of the stressful event, this attentional bias contributes to Irma's appraisal of the situation as overwhelming.

Distress intolerance also foments maladaptive behaviors that maintain psychopathology. Irma's focus on her experience of distress in the moment prevents her from allocating resources towards effective coping strategies. Because Irma believes she is helpless to manage the distress experienced, she perceives herself as powerless to change her situation. This perception, in turn, makes her seek immediate relief from distress by resorting to safety behaviors (e.g., having classmates complete the speaking portion of presentations; see Chapter 2) or avoidance (e.g., enrolling in classes that do not require public speaking). Importantly, Irma's fear of negative evaluation, which serves as the foundation for her public speaking fears, is exacerbated by her distress intolerance. Whereas someone with similar levels of social anxiety but higher levels of distress tolerance may be able to respond to public speaking with a "tough it out" attitude, Irma's distress intolerance magnifies her negative evaluation fears. As a result, Irma is more likely to resort to poor coping skills—including avoidance and safety behaviors—to help navigate public speaking.

CONCEPTUAL IMPLICATIONS

Cognitive Behavior Model of Distress Intolerance

Although there is no single, overarching model of distress intolerance (Zvolensky, Vujanovic, Bernstein, & Leyro, 2010), scientific evidence points

to several frameworks for understanding this construct. Some researchers nest distress intolerance under the umbrella of emotional intolerance (Leyro, Zvolensky, & Bernstein, 2010), along with other cognitive factors, including avoidance, anxiety sensitivity, and persistence (Zvolensky, Leyro, Bernstein, & Vujanovic, 2011). These hierarchical models highlight the multifaceted nature of distress intolerance (Bardeen, Fergus, & Orcutt, 2013; Simons & Gaher, 2005): uncertainty, ambiguity, frustration, and physical discomfort all capture distinct elements of the more general notion of distress (Bernstein, Zvolensky, Vujanovic, & Moos, 2009; Schmidt et al., 2011).

Conceptualizations of distress intolerance draw heavily from cognitive behavior models of emotion (Leyro et al., 2010). These models contend that thoughts, feelings, and behaviors influence one another in a bidirectional manner (Beck, 2011). Distress intolerance is also conceptually related to experiential avoidance (see Chapter 7, this handbook), though these processes are not entirely overlapping. Some researchers have posited that distress intolerance relates to information processing biases, such as an attentional bias for negative stimuli (Simons & Gaher, 2005; see also Chapter 12, this handbook). Relatedly, regulating negative emotion seems to be especially difficult for distress intolerant individuals with poor attentional control, which could reflect difficulty disengaging attention from a negative stimulus (Bardeen, Tull, Dixon-Gordon, Stevens, & Gratz, 2015). Furthermore, distress intolerance may be linked with negatively biased perceptions of one's ability to tolerate distress and regulate negative emotional responses, which could in turn lead to avoidance of stressful situations (Blalock & Joiner, 2000). The reward value of escaping or avoiding a negative situation, in turn, reinforces beliefs underlying perceived distress intolerance, strengthening these pathways over time (see Figure 6.1).

Role of Appraisals

Cognitive appraisals are central to the anticipation, experience, and consequences of distress. Individuals with high distress intolerance may catastrophize negative emotion and believe themselves incapable of tolerating a negative emotional state, which is a catalyst for behavioral avoidance or escape (Schmidt et al., 2011). In addition, individuals with distress intolerance harbor negative judgments about their own feelings of distress (Simons & Gaher, 2005), which can produce feelings of shame and inadequacy, as in Irma's case.

While general cognitive appraisals contribute to distress intolerance, distress intolerance also interacts with disorder-specific cognitive appraisals to influence risk for psychopathology. In the context of Irma's social anxiety symptoms, distress intolerance acts synergistically with her core fear of negative evaluation, thereby magnifying the social anxiety-fueled dread she feels during presentations. A similar example could apply in the case of a distress intolerant patient who experiences depressive symptoms, which are kindled by the core belief that he is weak and helpless. His distress intolerance interacts with his depressive cognitions, such that he appraises negative emotions as entirely overwhelming. He believes he is powerless to tolerate or change his situation, which fosters disengagement and social withdrawal. In short,

FIGURE 6.1. Cognitive Behavior Model of Distress Intolerance

Distress intolerance

+

Stressor

reinforcer

Avoid

Relief

reinforcer

Cognitions
- Appraisal of stressor/situation: *"This is terrible."*
- Perceived ability to tolerate situation: *"I can't handle this."*
- Reward value of escaping or avoiding: *"I need to get away from this to feel better."*

Behaviors
- Escape
- Avoidance

Emotions
- Anxiety
- Fear
- Negative urgency
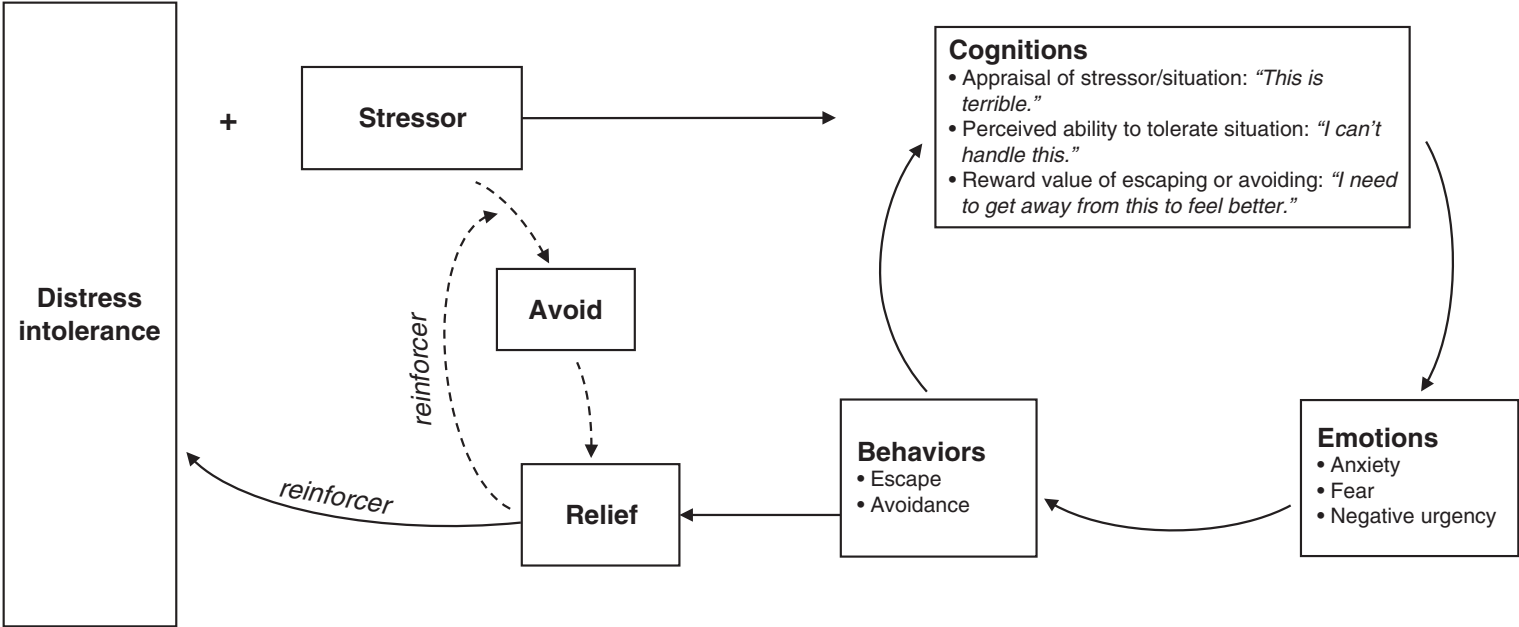
this patient's distress intolerance reinforces his perceived helplessness, and with it, the severity of his depression.

Role of Avoidance, Safety Behaviors, and Negative Reinforcement

By interacting with psychological vulnerabilities and information-processing biases, distress intolerance increases the risk that a person will engage in avoidance and safety behaviors (see Chapter 2). These maladaptive behaviors represent the strongest maintaining factors for anxiety disorders (Borkovec, 1979), as they incur the unintended consequence of bolstering an individual's perception that they are unable to handle experiences of distress (Trafton & Gifford, 2011). Over time, the avoidance–relief pathway is strengthened through negative reinforcement (as shown in Figure 6.1), which is likely to increase functional impairment and hinder recovery.

The reader may note that in spite of participating in presentations, Irma's fears failed to subside after accumulated positive experiences, ultimately leading her to change her major. The link between the Irma's distress intolerance and reliance on classmates as a "safety net" highlights the role of the reward learning framework. Individuals with distress intolerance display a seemingly impulsive tendency to opt for an immediate reward (i.e., relief from negative emotion; Trafton & Gifford, 2011). Conversely, tolerating distress involves inhibiting a response to an immediate negative reinforcement opportunity (i.e., withstanding distress). A person's willingness to "tough it out" in the short term—for instance, working through anxiety to give a presentation—may stem from the recognition of an associated long-term reward, such as earning a good grade in school.

ASSESSMENT

A number of self-report and behavioral measures capture distress intolerance. Self-report measures of this construct generally ask individuals to reflect on their *perceived ability* to endure distress, whereas behavioral measures evaluate the degree to which they persist toward a goal while completing physically or cognitively aversive tasks (Leyro et al., 2010). There exists considerable heterogeneity within each method of assessment, and no one measure has been identified or adopted as the gold standard (McHugh & Otto, 2012). The diversity of measures under the umbrella of distress intolerance reflects the many subfacets included under the higher order construct (Bardeen et al., 2013); some measures only focus on one particular lower order factor (e.g., physical discomfort), whereas others focus on negative emotions more broadly.

Self-Report Measures

The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) is one of the most frequently used self-report measures of distress intolerance. The DTS broadly examines an individual's perceived capacity to handle negative emotions

(e.g., "I'll do anything to avoid feeling distressed."). This 15-item measure has demonstrated good internal consistency (α = .82), as well as convergent, discriminant, and criterion validity (Simons & Gaher, 2005). The Frustration–Discomfort Scale (Harrington, 2005), similarly reflects intolerance of broadly defined unpleasant emotional experiences (e.g., "I can't stand doing things that involve a lot of hassle"), while placing a slightly greater emphasis on frustration. Its subscales exhibit good internal consistency, with alpha coefficients ranging from .84 to .88, and acceptable divergent and predictive validity (Harrington, 2005, 2006). The Distress Intolerance Index (DII; McHugh & Otto, 2012) combines these two measures in a short 10-item questionnaire, displaying excellent internal consistency in both nonclinical (α = .91) and clinical samples (α = .92). Higher scores on these measures have been linked with anxiety, obsessive-compulsive (OC), and trauma symptoms (Cougle, Timpano, Fitch, & Hawkins, 2011; Harrington, 2006; Macatee, Capron, Guthrie, Schmidt, & Cougle, 2015; Vinci, Mota, Berenz, & Connolly, 2016).

There are also numerous questionnaires that assess tolerance of *specific types* of distress, including *tolerance of ambiguity*, *uncertainty*, and *physical discomfort.* The Multiple Stimulus Types Ambiguity Tolerance-I (McLain, 1993) and the Tolerance of Ambiguity Scale-12 (Herman, Stevens, Bird, Mendenhall, & Oddou, 2010) have been used to assess perceived tolerance of ambiguous situations. Both demonstrate adequate psychometric properties (α = .86 and .73, respectively; Herman et al., 2010; McLain, 1993). Similarly, measures of the intolerance of uncertainty explore unwillingness to tolerate the possibility of future negative outcomes, even if these are unlikely to occur (see Chapter 3, this handbook). The Discomfort Intolerance Scale (Schmidt, Richey, & Fitzpatrick, 2006), on the other hand, evaluates the perceived inability to withstand unpleasant physical sensations or pain (e.g., "I take extreme measures to avoid feeling physically uncomfortable"). This brief five-item measure demonstrates acceptable internal (α = .70) and test–retest reliability, as well convergent and discriminant validity (Schmidt et al., 2006). Finally, measures of anxiety sensitivity (see Chapter 4, this handbook) capture fear of anxiety-related symptoms (i.e., fear of fear). Higher scores on many of these measures have also been associated with greater levels of psychological symptoms (Buckner, Keough, & Schmidt, 2007; Buhr & Dugas, 2006; Holaway, Heimberg, & Coles, 2006; Taylor, Koch, & McNally, 1992).

Behavioral Measures

Behavioral measures involving physical or cognitive tasks have been developed to capture, in real time, an individual's willingness to persist despite experiencing distress. Of note, most of these tasks do not address distress intolerance in the same manner or even focus on the same form of distress; however, they all presume to capture behavioral intolerance by assessing the length of time a participant persists in a given distressing task (Leyro et al., 2010). These measures have been linked to panic (Marshall et al., 2008), smoking cessation (Abrantes

et al., 2008), OC symptoms (Cougle, Timpano, Sarawgi, Smith, & Fitch, 2013), and general mood and anxiety psychopathology (Bernstein et al., 2011).

Distress intolerance tasks currently used in research utilize a range of physical and cognitive stimuli. Some physical distress intolerance tasks involve thermal stressors: for example, in the cold pressor task, an individual is asked to submerge a hand in ice water for as long as possible (Leyro et al., 2010). Other physical intolerance tasks involve intentionally eliciting signs of physiological arousal discomfort through breath-holding, hyperventilation, or the inhalation of carbon dioxide–enriched air (see Brown, Lejuez, Kahler, & Strong, 2002). Cognitive distress intolerance includes the Paced Auditory Serial Addition Test (PASAT; Gronwall & Sampson, 1974) and the mirror tracing persistence task (MTPT; Matthews & Stoney, 1988). The PASAT involves presenting single-digit numbers one after another while the participant is asked to continuously add together the last two digits given, while the MTPT requires the participant to trace a complex figure as if viewed in a mirror. Another cognitive measure, the anagram persistence task (Eisenberger & Leonard, 1980; Quinn, Brandon, & Copeland, 1996), asks participants to solve anagrams of varying difficulty, with time invested in challenging or unanswerable items used as a measure of distress tolerance (Leyro et al., 2010).

An adaptation of the Willingness to Pay scale (WTP-DI; McHugh, Hearon, Halperin, & Otto, 2011) combines elements of both behavioral and self-report instruments of distress intolerance. When completing the WTP-DI, an individual first undergoes a distressing task. Afterward, the individual is asked how much he or she would be willing to pay (expressed as a percentage of monthly income) never to reexperience the distress of the task, with willingness to pay greater amounts assumed to reflect distress intolerance (McHugh, Hearon, et al., 2011).

Assessment in a Clinical Context

The wide variety of instruments focused on distress intolerance provides clinicians with many ways to approach assessment. At the same time, it raises questions about the construct validity of distress intolerance and whether these measures truly reflect a single underlying construct. Ratings on self-report questionnaires often diverge from performance on behavioral tasks of distress intolerance (Ameral, Palm Reed, Cameron, & Armstrong, 2014; Glassman et al., 2016; McHugh, Daughters, et al., 2011). Performance (i.e., task persistence) on behavioral tasks has often *not* been linked to clinical features, even when distress tolerance in the same participants predicted symptoms (Bernstein et al., 2011; Hasan, Babson, Banducci, & Bonn-Miller, 2015) This may indicate that perceived distress intolerance is a stronger predictor of psychopathology. Measures such as the WTP-DI, which consists of both behavioral and self-report components, may help clarify this point in future research (McHugh, Hearon, et al., 2011).

Given the wide range of measures available for assessing distress intolerance, it might be difficult for the clinician to determine the best assessment

tool for a given case, both in terms of feasibility of use and content. Behavioral measures—with the notable exception of the WTP-DI—are almost certainly impractical in a clinical setting. With regard to self-report measures, clinicians may choose to assess the more general construct of distress intolerance or, rather, select a measure to better understand the specific type of distress the patient perceives as intolerable. Transdiagnostic measures of distress tolerance, such as the DII, could provide a good starting place for assessing the level of distress intolerance (McHugh & Otto, 2011). Clinicians may also simply ask patients about their perceived tolerance of whatever negative emotion is being experienced. The clinician's observation can also be a valuable tool in assessing distress intolerance, so long as distress intolerance is considered separately from other core fears.

CLINICAL IMPLICATIONS

Distress intolerance impacts a range of behaviors and emotion regulation processes (Simons & Gaher, 2005). Due to the ubiquity of distress intolerance across psychopathology (Dugas, Gosselin, & Ladouceur, 2001; Keough, Riccardi, Timpano, Mitchell, & Schmidt, 2010; Leyro et al., 2010; Timpano, Buckner, Richey, Murphy, & Schmidt, 2009), clinicians must be able to recognize and address patients' difficulties in tolerating negative emotion. Distress intolerance will manifest differently depending on a patient's primary symptoms. With anxiety disorders, distress intolerance may elicit an unwillingness to complete exposures. Thus, clinicians should be aware of ways in which distress intolerance may be impacting treatment progress and patient recovery, as well as how to increase willingness to withstand negative emotion in the face of distress intolerance. Below, we elaborate on specific considerations for anxiety-related disorders.

Implications for Fear-Based Conditions

Within general treatment seeking samples (Allan, Macatee, Norr, Raines, & Schmidt, 2015; Michel, Rowa, Young, & McCabe, 2016) and youth (Banducci, Lejuez, Dougherty, & MacPherson, 2017; Cummings et al., 2013; Wolitzky-Taylor et al., 2015), distress intolerance predicts general or composite measures of anxiety and fear. Additional studies have examined this relationship in the context of specific types of anxiety, including social anxiety, worry, and panic. Research indicates that distress intolerance is an important cognitive factor for all anxiety presentations (Keough et al., 2010; Kraemer, Luberto, & McLeish, 2013; Norr et al., 2013). However, the relationship between distress intolerance and perseverative thinking, as captured specifically by measures of worry, appears to be most robust and specific (Macatee et al., 2015).

Across all fear-based conditions, distress intolerance can influence how symptoms are expressed and exacerbated. First, distress intolerance interacts with other risk factors for anxiety. For example, research suggests that as

distress intolerance increases, anxiety sensitivity (i.e., the fear of anxiety-related physical sensations) is likely to increase in tandem (Schmidt et al., 2011). Similarly, individuals with experiences of childhood emotional abuse, and who also endorse distress intolerance, report the highest levels of anxiety and distress (Banducci et al., 2017).

A second pathway by which distress tolerance could help maintain anxiety symptoms is by fostering overly negative appraisals of a stressor and associated negative emotions (Simons & Gaher, 2005). This scenario was highlighted in Irma's case example. Distress intolerance made Irma experience her fear of negative evaluation as overwhelming and uncontrollable, which was compounded by a heightened attentional focus on her negative emotional state. Similarly, for a patient with panic disorder, distress intolerance might magnify the patient's focus on negative somatic sensations (Schmidt et al., 2011), also increasing the likelihood of interpreting sensations such as a racing heartbeat or feeling of faintness as threatening or dangerous.

The final pathway involves the likelihood that patients—regardless of diagnosis—will resort to unhelpful coping (Daughters et al., 2009; Korte, Unruh, Oglesby, & Schmidt, 2015). By relying on subtle safety aids (e.g., anti-anxiety medication "just in case") or behaviors (e.g., sitting near an exit), or falling back on avoidance, anxious patients with distress intolerance are at greater risk for maintaining anxiety symptoms. They are also more susceptible to relapsing following treatment gains when faced with threatening stimuli (Powers, Smits, & Telch, 2004).

Implications for Obsessive-Compulsive Spectrum Conditions

Research associates distress intolerance with the global severity of OC symptoms in people with and without full-fledged obsessive-compulsive disorder (OCD; Macatee, Capron, Schmidt, & Cougle, 2013). This suggests that distress intolerance is of clinical utility regardless of a patient's OC symptom severity. Additional research suggests that distress intolerance is more specifically linked with obsessions (Hezel, Riemann, & McNally, 2012), particularly those characterized as repugnant (e.g., sexual, religious, or aggressive intrusive thoughts; Cougle et al., 2013; Macatee et al., 2013). Notably, despite exhibiting emotional distress intolerance, individuals with OCD seem to display greater tolerance for physical pain (Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007), underscoring the idea that withstanding emotional and physical distress may not go hand in hand. With respect to other OC spectrum conditions, distress intolerance has also been associated with hoarding symptoms (Timpano et al., 2009; Timpano, Shaw, Cougle, & Fitch, 2014); no research has addressed connections to body dysmorphic disorder, tic disorders, or trichotillomania.

Distress intolerance may influence OC spectrum symptoms via several pathways. The first is by magnifying the intensity of obsessions, which patients already appraise as unacceptable and threatening. Patients with distress intolerance may pay even greater attention to obsessive thoughts and appraise them as more negative and uncontrollable. These patients feel incapable of

tolerating not only the distress associated with the obsessions, but also the distress of *not* performing a ritual—which functions to momentarily relieve anxiety due to an obsession—in response. The exacerbation of obsessions seen with distress intolerance is important to the course of OC symptoms, as distress intolerance predicts increased obsessions over time (Cougle et al., 2011).

A second way that distress intolerance contributes to the development and maintenance of OC symptoms is in interaction with negative urgency (i.e., the need to respond immediately to negative emotion). Distress intolerance may work in tandem with negative urgency, leading to difficulty inhibiting an immediate response to a negative reinforcement opportunity. In OCD, the immediate reward is relief from obsessions obtained through rituals. Thus, distress intolerance and high negative urgency are a "one-two punch" that renders irresistible the need to eradicate negative emotions through compulsions, suppression, or other neutralizing acts (Cougle et al., 2011; Macatee et al., 2013). Each time patients yield to a compulsive urge, however, they contribute to increasing the frequency and severity of obsessions, maintaining the disorder.

Research connecting OC symptoms and distress intolerance points to a number of clinical implications. Given that intolerance of negative emotion predicts increases in obsessions (Cougle et al., 2011), it is essential to assess for distress intolerance in patients at high risk of OCD, or who display subclinical symptoms. By learning to bolster distress tolerance through acceptance and commitment therapy or dialectical behavior therapy, a patient could conceivably weaken the link between obsessions (thoughts) and compulsions (behaviors). In early stages of OCD, increasing distress tolerance may arrest symptom progression; in treatment, it may augment exposure efficacy; and in recovery, it may help prevent relapse.

Implications for Trauma-Related Conditions

Only a fraction of people exposed to trauma develop chronic, trauma-related symptoms (Hezel et al., 2012). Moreover, while one person could develop posttraumatic stress disorder (PTSD) after one trauma event, another may endure several severe traumatic stressors without long-term repercussions (Johnson & Thompson, 2008). Distress intolerance may be one factor to help explain these holes in the dose-response theory of trauma and PTSD (Ozer & Weiss, 2004).

Research links distress intolerance with risk for developing PTSD symptoms after trauma exposure. The severity of PTSD symptoms relates to both self-reported (Vujanovic, Rathnayaka, Amador, & Schmitz, 2016) and behaviorally measured (Vujanovic, Dutcher, & Berenz, 2017) distress intolerance, particularly when coupled with intense negative emotion (Vujanovic et al., 2013). Distress intolerance predicts greater avoidance of trauma triggers and emotions, increased involuntary trauma reexperiencing, and nervous system hyperarousal (Vujanovic, Bernstein, & Litz, 2011). The link between distress

intolerance and PTSD remains robust when researchers account for variables known to relate to PTSD, such as number of traumas, neuroticism, sex, and substance use (Marshall-Berenz, Vujanovic, Bonn-Miller, Bernstein, & Zvolensky, 2010; Vujanovic, Bonn-Miller, Potter, Marshall, & Zvolensky, 2011).

Distress intolerance stands to amplify the posttraumatic stress response at various stages in the development of PTSD symptoms and may also contribute to the maintenance of the disorder. Individuals with distress intolerance display greater reactivity during a traumatic event, as well as an attentional bias toward trauma-related threats *after* the experience, which magnifies the emotional toll of coping with trauma (Marshall-Berenz et al., 2010). Distress intolerance may also influence the manner in which a traumatic memory is formed. Research suggests that shallow encoding of the trauma in memory may engender risk for PTSD, as this could influence both the unwanted reexperiencing of the trauma and poor intentional recall of the trauma seen in PTSD (Ehlers & Clark, 2000). Given their greater unwillingness to withstand negative emotion, distress intolerant individuals could be more susceptible to processing and storing information in a manner that increases PTSD risk. Moreover, distress intolerance might increase *as a result of* trauma exposure (Foa & Kozak, 1986), which could further exacerbate or maintain PTSD.

Clinically, distress intolerance contributes to high-risk behaviors in patients with PTSD. Perceiving their ability to cope with trauma-related distress as low (Ehlers & Clark, 2000), distress intolerant patients may turn to marijuana (Potter, Vujanovic, Marshall-Berenz, Bernstein, & Bonn-Miller, 2011) and alcohol (Vujanovic, Marshall-Berenz, & Zvolensky, 2011) to cope with PTSD symptoms and negative affect. For these reasons, as well as the cognitive and emotional burden of constantly attempting to overregulate negative emotion (Vujanovic, Bernstein, et al., 2011), distress intolerance complicates trauma treatment. Distress intolerant patients may display minimal symptom improvement, which likely reflects reliance on safety behaviors or other avoidance during exposures. Thus, the efficacy of exposures may depend on increasing willingness to approach feared situations. Underscoring this idea, studies suggest that successful treatment of PTSD with exposure therapy hinges on reductions in perceived distress (Bluett, Zoellner, & Feeny, 2014), which likely correspond to increases in distress tolerance.

CONCLUSION

Defined as the inability to withstand a negative emotional state, distress intolerance is a type of poor emotion regulation that appears to influence a range of psychopathological symptoms. Though traditionally linked to borderline personality disorder, distress intolerance has been empirically connected to anxiety, OC, and trauma-related disorders, as well as symptoms of depressive, alcohol/substance use, and eating disorders. Across these syndromes, distress intolerance can influence a person's appraisal of a stressful stimulus, perceived

ability to tolerate resulting distress, and behavioral coping response. Though distress intolerance in itself may present a risk factor for psychopathology, it also works synergistically with other cognitive and emotional tolerance factors to increase risk for psychopathology.

In this chapter, and in line with the majority of research on the topic, we have focused our discussion on distress *in*tolerance as a predictor of psychopathology; however, tolerance of distress is not unilaterally desirable. In fact, distress *awareness* is key to survival and general functioning, as healthy distress tolerance involves awareness of one's own emotions, urges, and sensations (Lynch & Mizon, 2011). Nevertheless, distress intolerance remains a promising avenue for continued research on models of psychopathology, as well as an emerging treatment target in cognitive behavior therapy for a variety of psychological conditions, as well as other empirically supported therapies—namely, acceptance and commitment therapy and dialectical behavior therapy.

REFERENCES

Abrantes, A. M., Strong, D. R., Lejuez, C. W., Kahler, C. W., Carpenter, L. L., Price, L. H., . . . Brown, R. A. (2008). The role of negative affect in risk for early lapse among low distress tolerance smokers. *Addictive Behaviors*, *33*, 1394–1401. http://dx.doi.org/10.1016/j.addbeh.2008.06.018

Allan, N. P., Macatee, R. J., Norr, A. M., Raines, A. M., & Schmidt, N. B. (2015). Relations between common and specific factors of anxiety sensitivity and distress tolerance and fear, distress, and alcohol and substance use disorders. *Journal of Anxiety Disorders*, *33*, 81–89. http://dx.doi.org/10.1016/j.janxdis.2015.05.002

Ameral, V., Palm Reed, K. M., Cameron, A., & Armstrong, J. L. (2014). What are measures of distress tolerance really capturing? A mixed methods analysis. *Psychology of Consciousness*, *1*, 357–369. http://dx.doi.org/10.1037/cns0000024

Banducci, A. N., Lejuez, C. W., Dougherty, L. R., & MacPherson, L. (2017). A prospective examination of the relations between emotional abuse and anxiety: Moderation by distress tolerance. *Prevention Science*, *18*, 20–30. http://dx.doi.org/10.1007/s11121-016-0691-y

Bardeen, J. R., Fergus, T. A., & Orcutt, H. K. (2013). Testing a hierarchical model of distress tolerance. *Journal of Psychopathology and Behavioral Assessment*, *35*, 495–505. http://dx.doi.org/10.1007/s10862-013-9359-0

Bardeen, J. R., Tull, M. T., Dixon-Gordon, K. L., Stevens, E. N., & Gratz, K. L. (2015). Attentional control as a moderator of the relationship between difficulties accessing effective emotion regulation strategies and distress tolerance. *Journal of Psychopathology and Behavioral Assessment*, *37*, 79–84. http://dx.doi.org/10.1007/s10862-014-9433-2

Beck, J. S. (2011). *Cognitive behavior therapy: Basics and beyond*. New York, NY: Guilford Press.

Bernstein, A., Marshall, E. C., & Zvolensky, M. J. (2011). Multi-method evaluation of distress tolerance measures and construct(s): Concurrent relations to mood and anxiety psychopathology and quality of life. *Journal of Experimental Psychopathology*, *2*, 386–399. http://dx.doi.org/10.5127/jep.006610

Bernstein, A., Zvolensky, M. J., Vujanovic, A. A., & Moos, R. (2009). Integrating anxiety sensitivity, distress tolerance, and discomfort intolerance: A hierarchical model of affect sensitivity and tolerance. *Behavior Therapy*, *40*, 291–301. http://dx.doi.org/10.1016/j.beth.2008.08.001

Blalock, J. A., & Joiner, T. E., Jr. (2000). Interaction of cognitive avoidance coping and stress in predicting depression/anxiety. *Cognitive Therapy and Research*, *24*, 47–65. http://dx.doi.org/10.1023/A:1005450908245

Bluett, E. J., Zoellner, L. A., & Feeny, N. C. (2014). Does change in distress matter? Mechanisms of change in prolonged exposure for PTSD. *Journal of Behavior Therapy and Experimental Psychiatry*, *45*, 97–104. http://dx.doi.org/10.1016/j.jbtep.2013.09.003

Borkovec, T. D. (1979). Extensions of two-factor theory: Cognitive avoidance and autonomic perception. In N. Birbaumer & H. D. Kimmel (Eds.), *Biofeedback and self-regulation* (pp. 139–148). Hillsdale, NJ: Erlbaum.

Brown, R. A., Lejuez, C. W., Kahler, C. W., & Strong, D. R. (2002). Distress tolerance and duration of past smoking cessation attempts. *Journal of Abnormal Psychology*, *111*, 180–185. http://dx.doi.org/10.1037/0021-843X.111.1.180

Buckner, J. D., Keough, M. E., & Schmidt, N. B. (2007). Problematic alcohol and cannabis use among young adults: The roles of depression and discomfort and distress tolerance. *Addictive Behaviors*, *32*, 1957–1963. http://dx.doi.org/10.1016/j.addbeh.2006.12.019

Buhr, K., & Dugas, M. J. (2006). Investigating the construct validity of intolerance of uncertainty and its unique relationship with worry. *Journal of Anxiety Disorders*, *20*, 222–236. http://dx.doi.org/10.1016/j.janxdis.2004.12.004

Cougle, J. R., Timpano, K. R., Fitch, K. E., & Hawkins, K. A. (2011). Distress tolerance and obsessions: An integrative analysis. *Depression and Anxiety*, *28*, 906–914. http://dx.doi.org/10.1002/da.20846

Cougle, J. R., Timpano, K. R., Sarawgi, S., Smith, C. M., & Fitch, K. E. (2013). A multimodal investigation of the roles of distress tolerance and emotional reactivity in obsessive-compulsive symptoms. *Anxiety, Stress, and Coping: An International Journal*, *26*, 478–492. http://dx.doi.org/10.1080/10615806.2012.697156

Cummings, J. R., Bornovalova, M. A., Ojanen, T., Hunt, E., MacPherson, L., & Lejuez, C. (2013). Time doesn't change everything: The longitudinal course of distress tolerance and its relationship with externalizing and internalizing symptoms during early adolescence. *Journal of Abnormal Child Psychology*, *41*, 735–748. http://dx.doi.org/10.1007/s10802-012-9704-x

Daughters, S. B., Reynolds, E. K., MacPherson, L., Kahler, C. W., Danielson, C. K., Zvolensky, M., & Lejuez, C. W. (2009). Distress tolerance and early adolescent externalizing and internalizing symptoms: The moderating role of gender and ethnicity. *Behaviour Research and Therapy*, *47*, 198–205. http://dx.doi.org/10.1016/j.brat.2008.12.001

Dugas, M. J., Gosselin, P., & Ladouceur, R. (2001). Intolerance of uncertainty and worry: Investigating specificity in a nonclinical sample. *Cognitive Therapy and Research*, *25*, 551–558. http://dx.doi.org/10.1023/A:1005553414688

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, *38*, 319–345. http://dx.doi.org/10.1016/S0005-7967(99)00123-0

Eisenberger, R., & Leonard, J. M. (1980). Effects of conceptual task difficulty on generalized persistence. *The American Journal of Psychology*, *93*, 285–298. http://dx.doi.org/10.2307/1422233

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin*, *99*, 20–35. http://dx.doi.org/10.1037/0033-2909.99.1.20

Geisser, M. E., Robinson, M. E., & Pickren, W. E. (1992). Differences in cognitive coping strategies among pain-sensitive and pain-tolerant individuals on the cold-pressor test. *Behavior Therapy*, *23*, 31–41. http://dx.doi.org/10.1016/S0005-7894(05)80306-5

Glassman, L. H., Martin, L. M., Bradley, L. E., Ibrahim, A., Goldstein, S. P., Forman, E. M., & Herbert, J. D. (2016). A brief report on the assessment of distress tolerance: Are we measuring the same construct? *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *34*, 87–99. http://dx.doi.org/10.1007/s10942-015-0224-9

Gronwall, D. M., & Sampson, H. (1974). *The psychological effects of concussion*. Oxford, England: Auckland University Press.

Harrington, N. (2005). The Frustration Discomfort Scale: Development and psychometric properties. *Clinical Psychology & Psychotherapy*, *12*, 374–387. http://dx.doi.org/10.1002/cpp.465

Harrington, N. (2006). Frustration intolerance beliefs: Their relationship with depression, anxiety, and anger, in a clinical population. *Cognitive Therapy and Research*, *30*, 699–709. http://dx.doi.org/10.1007/s10608-006-9061-6

Hasan, N. S., Babson, K. A., Banducci, A. N., & Bonn-Miller, M. O. (2015). The prospective effects of perceived and laboratory indices of distress tolerance on cannabis use following a self-guided quit attempt. *Psychology of Addictive Behaviors*, *29*, 933–940. http://dx.doi.org/10.1037/adb0000132

Herman, J. L., Stevens, M. J., Bird, A., Mendenhall, M., & Oddou, G. (2010). The Tolerance for Ambiguity Scale: Towards a more refined measure for international management research. *International Journal of Intercultural Relations*, *34*, 58–65. http://dx.doi.org/10.1016/j.ijintrel.2009.09.004

Hezel, D. M., Riemann, B. C., & McNally, R. J. (2012). Emotional distress and pain tolerance in obsessive–compulsive disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*, 981–987. http://dx.doi.org/10.1016/j.jbtep.2012.03.005

Holaway, R. M., Heimberg, R. G., & Coles, M. E. (2006). A comparison of intolerance of uncertainty in analogue obsessive-compulsive disorder and generalized anxiety disorder. *Journal of Anxiety Disorders*, *20*, 158–174. http://dx.doi.org/10.1016/j.janxdis.2005.01.002

Johnson, H., & Thompson, A. (2008). The development and maintenance of posttraumatic stress disorder (PTSD) in civilian adult survivors of war trauma and torture: A review. *Clinical Psychology Review*, *28*, 36–47. http://dx.doi.org/10.1016/j.cpr.2007.01.017

Keough, M. E., Riccardi, C. J., Timpano, K. R., Mitchell, M. A., & Schmidt, N. B. (2010). Anxiety symptomatology: The association with distress tolerance and anxiety sensitivity. *Behavior Therapy*, *41*, 567–574. http://dx.doi.org/10.1016/j.beth.2010.04.002

Korte, K. J., Unruh, A. S., Oglesby, M. E., & Schmidt, N. B. (2015). Safety aid use and social anxiety symptoms: The mediating role of perceived control. *Psychiatry Research*, *228*, 510–515. http://dx.doi.org/10.1016/j.psychres.2015.06.006

Kraemer, K. M., Luberto, C. M., & McLeish, A. C. (2013). The moderating role of distress tolerance in the association between anxiety sensitivity physical concerns and panic and PTSD-related re-experiencing symptoms. *Anxiety, Stress, and Coping: An International Journal*, *26*, 330–342. http://dx.doi.org/10.1080/10615806.2012.693604

Leyro, T. M., Zvolensky, M. J., & Bernstein, A. (2010). Distress tolerance and psychopathological symptoms and disorders: A review of the empirical literature among adults. *Psychological Bulletin*, *136*, 576–600. http://dx.doi.org/10.1037/a0019712

Lloyd-Richardson, E. E., Perrine, N., Dierker, L., & Kelley, M. L. (2007). Characteristics and functions of non-suicidal self-injury in a community sample of adolescents. *Psychological Medicine*, *37*, 1183–1192. http://dx.doi.org/10.1017/S003329170700027X

Lynch, T. R., & Mizon, G. A. (2011). Distress overtolerance and distress intolerance: A behavioral perspective. In M. Zvolensky, A. Bernstein, & A. A. Vujanovic (Eds.), *Distress tolerance: Theory, research, and clinical applications* (pp. 552–79). New York, NY: Guilford Press.

Macatee, R. J., Capron, D. W., Guthrie, W., Schmidt, N. B., & Cougle, J. R. (2015). Distress tolerance and pathological worry: Tests of incremental and prospective relationships. *Behavior Therapy*, *46*, 449–462. http://dx.doi.org/10.1016/j.beth.2015.03.003

Macatee, R. J., Capron, D. W., Schmidt, N. B., & Cougle, J. R. (2013). An examination of low distress tolerance and life stressors as factors underlying obsessions. *Journal of Psychiatric Research*, *47*, 1462–1468. http://dx.doi.org/10.1016/j.jpsychires.2013.06.019

Marshall, E. C., Zvolensky, M. J., Vujanovic, A. A., Gregor, K., Gibson, L. E., & Leyro, T. M. (2008). Panic reactivity to voluntary hyperventilation challenge predicts distress tolerance to bodily sensations among daily cigarette smokers. *Experimental and Clinical Psychopharmacology*, *16*, 313–321. http://dx.doi.org/10.1037/a0012752

Marshall-Berenz, E. C., Vujanovic, A. A., Bonn-Miller, M. O., Bernstein, A., & Zvolensky, M. J. (2010). Multimethod study of distress tolerance and PTSD symptom severity in a trauma-exposed community sample. *Journal of Traumatic Stress*, *23*, 623–630. http://dx.doi.org/10.1002/jts.20568

Matthews, K. A., & Stoney, C. M. (1988). Influences of sex and age on cardiovascular responses during stress. *Psychosomatic Medicine*, *50*, 46–56. http://dx.doi.org/10.1097/00006842-198801000-00006

McHugh, R. K., Daughters, S. B., Lejuez, C. W., Murray, H. W., Hearon, B. A., Gorka, S. M., & Otto, M. W. (2011). Shared variance among self-report and behavioral measures of distress intolerance. *Cognitive Therapy and Research*, *35*, 266–275. http://dx.doi.org/10.1007/s10608-010-9295-1

McHugh, R. K., Hearon, B. A., Halperin, D. M., & Otto, M. W. (2011). A novel method for assessing distress intolerance: Adaptation of a measure of willingness to pay. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*, 440–446. http://dx.doi.org/10.1016/j.jbtep.2011.04.003

McHugh, R. K., & Otto, M. W. (2011). Domain-general and domain-specific strategies for the assessment of distress intolerance. *Psychology of Addictive Behaviors*, *25*, 745–749. http://dx.doi.org/10.1037/a0025094

McHugh, R. K., & Otto, M. W. (2012). Refining the measurement of distress intolerance. *Behavior Therapy*, *43*, 641–651. http://dx.doi.org/10.1016/j.beth.2011.12.001

McLain, D. L. (1993). The MSTAT-I: A new measure of an individual's tolerance for ambiguity. *Educational and Psychological Measurement*, *53*, 183–189. http://dx.doi.org/10.1177/0013164493053001020

Michel, N. M., Rowa, K., Young, L., & McCabe, R. E. (2016). Emotional distress tolerance across anxiety disorders. *Journal of Anxiety Disorders*, *40*, 94–103. http://dx.doi.org/10.1016/j.janxdis.2016.04.009

Norr, A. M., Oglesby, M. E., Capron, D. W., Raines, A. M., Korte, K. J., & Schmidt, N. B. (2013). Evaluating the unique contribution of intolerance of uncertainty relative to other cognitive vulnerability factors in anxiety psychopathology. *Journal of Affective Disorders*, *151*, 136–142. http://dx.doi.org/10.1016/j.jad.2013.05.063

Ozer, E. J., & Weiss, D. S. (2004). Who develops posttraumatic stress disorder? *Current Directions in Psychological Science*, *13*, 169–172. http://dx.doi.org/10.1111/j.0963-7214.2004.00300.x

Potter, C. M., Vujanovic, A. A., Marshall-Berenz, E. C., Bernstein, A., & Bonn-Miller, M. O. (2011). Posttraumatic stress and marijuana use coping motives: The mediating role of distress tolerance. *Journal of Anxiety Disorders*, *25*, 437–443. http://dx.doi.org/10.1016/j.janxdis.2010.11.007

Powers, M. B., Smits, J. A., & Telch, M. J. (2004). Disentangling the effects of safety-behavior utilization and safety-behavior availability during exposure-based treatment: A placebo-controlled trial. *Journal of Consulting and Clinical Psychology*, *72*, 448–454. http://dx.doi.org/10.1037/0022-006X.72.3.448

Quinn, E. P., Brandon, T. H., & Copeland, A. L. (1996). Is task persistence related to smoking and substance abuse? The application of learned industriousness theory to addictive behaviors. *Experimental and Clinical Psychopharmacology*, *4*, 186–190. http://dx.doi.org/10.1037/1064-1297.4.2.186

Schmidt, N., Mitchell, M., Keough, M., & Riccardi, C. (2011). Anxiety and its disorders. In M. Zvolensky, A. Bernstein, & A. A. Vujanovic (Eds.), *Distress tolerance: Theory, research, and clinical applications* (pp. 105–125). New York, NY: Guilford Press.

Schmidt, N. B., Richey, J. A., & Fitzpatrick, K. K. (2006). Discomfort intolerance: Development of a construct and measure relevant to panic disorder. *Journal of Anxiety Disorders*, *20*, 263–280. http://dx.doi.org/10.1016/j.janxdis.2005.02.002

Simons, J. S., & Gaher, R. M. (2005). The Distress Tolerance Scale: Development and validation of a self-report measure. *Motivation and Emotion*, *29*, 83–102. http://dx.doi.org/10.1007/s11031-005-7955-3

Taylor, S., Koch, W. J., & McNally, R. J. (1992). How does anxiety sensitivity vary across the anxiety disorders? *Journal of Anxiety Disorders*, *6*, 249–259. http://dx.doi.org/10.1016/0887-6185(92)90037-8

Timpano, K. R., Buckner, J. D., Richey, J. A., Murphy, D. L., & Schmidt, N. B. (2009). Exploration of anxiety sensitivity and distress tolerance as vulnerability factors for hoarding behaviors. *Depression and Anxiety*, *26*, 343–353. http://dx.doi.org/10.1002/da.20469

Timpano, K. R., Shaw, A. M., Cougle, J. R., & Fitch, K. E. (2014). A multifaceted assessment of emotional tolerance and intensity in hoarding. *Behavior Therapy*, *45*, 690–699. http://dx.doi.org/10.1016/j.beth.2014.04.002

Trafton, J. A., & Gifford, E. V. (2011). Biological bases of distress tolerance. In M. Zvolensky, A. Bernstein, & A. A. Vujanovic (Eds.), *Distress tolerance: Theory, research, and clinical applications* (pp. 80–104). New York, NY: Guilford Press.

Vinci, C., Mota, N., Berenz, E., & Connolly, K. (2016). Examination of the relationship between PTSD and distress tolerance in a sample of male veterans with comorbid substance use disorders. *Military Psychology*, *28,* 104–114. http://dx.doi.org/10.1037/mil0000100

Vujanovic, A. A., Bernstein, A., & Litz, B. (2011). Traumatic stress. In M. Zvolensky, A. Bernstein, & A. A. Vujanovic (Eds.), *Distress tolerance: Theory, research, and clinical applications* (pp. 126–148). New York, NY: Guilford Press.

Vujanovic, A. A., Bonn-Miller, M. O., Potter, C. M., Marshall, E. C., & Zvolensky, M. J. (2011). An evaluation of the relation between distress tolerance and posttraumatic stress within a trauma-exposed sample. *Journal of Psychopathology and Behavioral Assessment*, *33*, 129–135. http://dx.doi.org/10.1007/s10862-010-9209-2

Vujanovic, A. A., Dutcher, C. D., & Berenz, E. C. (2017). Multimodal examination of distress tolerance and posttraumatic stress disorder symptoms in acute-care psychiatric inpatients. *Journal of Anxiety Disorders*, *48*, 45–53. http://dx.doi.org/10.1016/j.janxdis.2016.08.005

Vujanovic, A. A., Hart, A. S., Potter, C. M., Berenz, E. C., Niles, B., & Bernstein, A. (2013). Main and interactive effects of distress tolerance and negative affect intensity in relation to PTSD Symptoms among trauma-exposed adults. *Journal of Psychopathology and Behavioral Assessment*, *35*, 235–243. http://dx.doi.org/10.1007/s10862-012-9325-2

Vujanovic, A. A., Marshall-Berenz, E. C., & Zvolensky, M. J. (2011). Posttraumatic stress and alcohol use motives: A test of the incremental and mediating role of distress tolerance. *Journal of Cognitive Psychotherapy*, *25*, 130–141. http://dx.doi.org/10.1891/0889-8391.25.2.130

Vujanovic, A. A., Rathnayaka, N., Amador, C. D., & Schmitz, J. M. (2016). Distress tolerance: Associations with posttraumatic stress disorder symptoms among trauma-exposed, cocaine-dependent adults. *Behavior Modification*, *40,* 120–143. http://dx.doi.org/10.1177/0145445515621490

Wolitzky-Taylor, K., Guillot, C. R., Pang, R. D., Kirkpatrick, M. G., Zvolensky, M. J., Buckner, J. D., & Leventhal, A. M. (2015). Examination of anxiety sensitivity and distress tolerance as transdiagnostic mechanisms linking multiple anxiety pathologies to alcohol use problems in adolescents. *Alcoholism: Clinical and Experimental Research*, *39*, 532–539. http://dx.doi.org/10.1111/acer.12638

Zvolensky, M. J., Leyro, T. M., Bernstein, A., & Vujanovic, A. A. (2011). Historical perspectives, theory, and measurement of distress tolerance. In M. Zvolensky, A. Bernstein, & A. A. Vujanovic (Eds.), *Distress tolerance: Theory, research, and clinical applications* (pp. 3–27). New York, NY: Guilford Press.

Zvolensky, M. J., Vujanovic, A. A., Bernstein, A., & Leyro, T. (2010). Distress tolerance: Theory, measurement, and relations to psychopathology. *Current Directions in Psychological Science*, *19*, 406–410. http://dx.doi.org/10.1177/0963721410388642

7

Experiential Avoidance

Sarah A. Hayes-Skelton and Elizabeth H. Eustis

May is a 30-year-old Asian American cisgender woman who identifies as queer. She currently works at a local hospital, but she dreams of becoming involved in LGBTQ+ advocacy work in her community. There is a local group that is often looking for volunteers to work with LGBTQ+ youth in the community, but May hasn't been able to participate yet because of the distress about her anxiety. Recently, she again attempted to attend an event with this LGBTQ+ outreach group. She felt anxious walking there and had thoughts like "What if no one talks to me?" and "My family wouldn't be supportive of this." These thoughts were followed by an increased heart rate and sweaty palms. May desperately wanted to make these thoughts and physical sensations go away. She tried to make them stop, but they only seemed to become more intense the more she fought them. She tried to make her mind go blank, with no luck. In fact, she started feeling more upset and even started remembering past times when she experienced intense anxiety. When she was growing up, members of May's immediate family conveyed messages to her that emotions were "bad" and should not be expressed. These messages were consistent with her family's cultural background and did not seem to cause her parents (who immigrated to the United States from China) distress, but May now finds that when she feels a strong emotion, like anxiety, it makes her very uncomfortable, and she tries to get rid of it immediately. In her attempt to attend the event, she thought: "If only I wasn't anxious, I could go to the meeting and be how I want to be. What's wrong with me that I can't even get myself to go to a simple meeting?" Instead, she turned around and went home to escape the distress she was experiencing.[1]

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[1]All clinical case material has been altered to protect patient confidentiality.

If we examine May's cycle of anxiety, we can see that it is not just her experiences of anxiety that cause her distress and constrict her behavior; rather, her attempts to control her internal experiences (e.g., thoughts, emotions, physiological sensations, memories) seem to exacerbate her distress and further limit her behavior, while also making her feel like she cannot change her life until her anxiety goes away. In May's desperate attempt to make her anxious thoughts and physical sensations stop, she likely notices the ways that she is unable to do so, making her more upset with herself and leading her to feel more out of control, and thus further increasing her anxiety. For May, it is the additional anxiety, anger, and frustration at not being able to stop her anxiety that ultimately contributes to her avoiding the event. It is this unwillingness to remain in contact with distressing internal experiences along with the attempts to control or avoid these experiences regardless of consequences that is referred to as *experiential avoidance* (EA; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996).

Of note, avoidance of distressing internal experiences can be an effective emotion regulation strategy when used flexibly and with intention. In fact, there are times when we all choose to avoid distressing internal experiences (e.g., workplace, performance situations, situations in which it may be culturally inconsistent to express emotions). However, when EA becomes habitual, rigid, and automatic, it tends to cause significant distress and impairment in people's lives. This habitual use of EA is more common among those with clinical levels of anxiety across a range of clinical presentations of anxiety, as discussed later in this chapter.

There is ongoing discussion about how to best define, measure, and refer to EA. Often EA is referred to through its opposing process—*acceptance*, or allowing internal experiences to come and go without trying to change them. For example, if a treatment increases acceptance, it decreases EA. Some in the field have begun to use the term *psychological inflexibility* in place of EA (Bond et al., 2011). Psychological inflexibility, which is a broad construct, typically refers to the six processes that contribute to psychopathology in the acceptance and commitment therapy model (see Chapter 18). In addition to EA, the other five processes include (a) cognitive fusion[2] or seeing thoughts as the truth or facts; (b) dominance of conceptualized past and future or focusing attention on the past or future instead of the present; (c) attachment to the conceptualized self or the labels that we have of ourselves; (d) lack of values clarity or difficulty recognizing what is important or fulfilling in life; and (e) unworkable action or behaviors, including impulsive, reactive, or habitual responses (Hayes, Strosahl, & Wilson, 2012). *Psychological flexibility* typically refers to processes that are in opposition to psychological inflexibility. Therefore, there is currently some inconsistency in the usage of the terms EA, acceptance, and psychological inflexibility/psychological flexibility (see Bond et al., 2011; Hayes et al., 2012).

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[2]Fusion refers to the process of believing that a thought is an accurate depiction of reality.

CONCEPTUAL IMPLICATIONS

An Acceptance-Based Behavioral Model of Anxiety

According to an acceptance-based behavioral model of anxiety (Roemer & Orsillo, 2014), anxiety is characterized by a fused, narrowed, reactive, and judgmental relationship with internal experiences along with the strong desire to not have the anxious experiences (EA), which only serves to increase the problematic relationship with the anxious experiences. As a result of this cycle of EA and the fused, judgmental relationship with internal experiences, it is natural to then avoid future situations and limit experiences that will increase anxiety. In other words, anxiety is maintained by (a) a problematic fused relationship with internal experiences, (b) EA, and (c) behavioral constriction and avoidance. For May, her beliefs that anxiety is "bad" and that it makes one "weak" may lead her to a fused identification with those experiences in which she identifies anxiety, and therefore herself, as bad and weak, which can contribute to engaging in EA rigidly. When anxiety is experienced as a negative indication of self-worth, it is only natural to want to avoid the internal experiences that have become signs of anxiety. However, when individuals try to push away the internal experiences that fuel anxiety, they are often unable to do so, which only serves to increase the fusion and self-judgment about their inability to rid themselves of anxiety.

We can see how May's strong desire to make her mind go blank paradoxically results in her anxiety becoming stronger. This is likely because her inability to make her anxiety go away makes her more judgmental and reactive to her thoughts about not being able to go to the event because of her anxiety. She may say to herself things like "What is wrong with me that I can't even go to this event? I just need to force myself to not be anxious." However, these thoughts likely lead to more physiological arousal, which likely makes the thoughts more fused and judgmental, continuing the cycle of EA and the problematic relationship with her internal experiences. For example, she may experience thoughts such as, "Look at me, I can't even make my own body calm down, how could I ever think that I could be a leader." As a result, May avoids going to the event, which reduces her anxiety; however, it also leads to additional negative thoughts about her inability to control her anxiety. As can be seen in this example, the cycle of anxiety is fueled not by the anxious experiences themselves, but by May's efforts to deny and avoid the anxiety, which ultimately fail, making her feel worse about herself, and increasing her anxiety further.

While this model was originally developed specifically for generalized anxiety disorder, it is broadly applicable to anxiety in general and is consistent with a transdiagnostic approach to anxiety. Following are further descriptions of how negative, judgmental thoughts, failed attempts at suppression of anxiety, and the consequences of avoidance further strengthen and maintain EA.

Role of Negative, Judgmental Thoughts

Anxiety is an adaptive response to a potentially dangerous situation. Therefore, it is natural to experience physiological sensations in response to an actual or anticipated anxiety-provoking situation, such as the increased heart rate and sweaty palms that May experienced when thinking about attending the advocacy event. While these responses are often adaptive, they can become problematic when the individual rigidly reacts to them with judgment. It is not the thoughts, feelings, or sensations that are problematic, but the response to them that exacerbates anxiety. In other words, these entangled (Germer, 2005), "hooked" (Chodron, 2007), or fused (Herzberg et al., 2012) relationships with our experiences lead to stronger desires to engage in EA.

Similarly, EA can develop from labeling emotional experiences as "negative" or "bad," which can understandably lead people to try to avoid their internal experiences. We are socialized in societies that often model and praise the suppression of emotions (e.g., children being told to stop crying), of course this varies based on familial culture. Given our use of language (see relational frame theory; Hayes et al., 2012), if we label certain experiences as "bad," even thinking about the experience can cause distress and lead to EA. However, it is also important to acknowledge that this avoidance is only problematic if it causes the individual significant distress and/or has behavioral consequences. Therefore, for some individuals across diverse cultures, suppression of emotions can also be adaptive in certain contexts.

Role of Failed Suppression and Control

One of the challenges around trying to control anxiety is that often our attempts at control work and are helpful, at least in the short term. However, once someone begins trying to control internal experiences and is unable to do so, a vicious loop can develop in which the inability to control internal experiences is judged as "bad." For example, May looks at other people in her community and other people who identified as queer and looks up to their ability to work for change, but she also uses this information to criticize herself even further by thinking, "What's wrong with me that I can't get over my anxiety while other people can?" In this way, her response is making the anxiety stronger and therefore also increasing the desire to engage in EA.

It is common for people to try many different ways to control their anxiety, even when they are not successful. Some common examples are attempts to clear the mind and not think of anything, as well as to limit behavior that may cause anxiety (e.g., not engaging in social interactions, not applying for jobs). One of the challenges with trying to limit behavior in this way is that there is always some possibility that a situation may cause anxiety or something stressful may occur (e.g., "what if"), so it is possible to fear and attempt to avoid any and all situations. We know from the thought suppression literature (Purdon, 1999; Wegner, Schneider, Carter, & White, 1987) that the

more effort one makes to push away an internal experience, the stronger it returns (see Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Roemer & Borkovec, 1994). People may also use a range of substances (e.g., alcohol) or risky behaviors (e.g., self-harm, risky sex) to try to avoid their internal experiences and shift their attention to something else. While these strategies may feel effective in the short term, they tend to have long-term consequences.

Consequences of Avoidance

EA can have many consequences, including increased distress and behavioral consequences. When situations are perceived as leading to troubling internal experiences and subsequent EA, then it is only natural that individuals will avoid those situations. Individuals with anxiety often constrict their lives in an effort to avoid these experiences. In the case of May, we see that she desperately wants to be involved in her community; however, she has been unable to attend events and thinks she must control her anxiety before she can become more involved. Given that she may not master this level of control over her anxiety, she will likely never get involved unless and until she is willing to accept that she will have some anxiety, at least in the beginning.

Rigid use of EA can also negatively impact relationships, given that people may spend a significant amount of time trying to control their internal experiences and/or distract from them, which makes it difficult to engage in the present moment and with the people around them. For example, May often finds herself caught up in trying to feel less anxious while eating dinner with her family. This often means that she misses part of the conversation and seems distracted. When her family members ask her if she is okay, she feels bad and is not sure what to say. Her anxiety increases as her family's reactions cause her to increase her judgments about her own anxiety and, thus, her desire to avoid and suppress her anxiety, continuing the EA loop.

ASSESSMENT

Because EA is habitual and can feel automatic, some patients may be unaware of their use of EA and how it contributes to and maintains their anxiety. Instead, patients may describe their anxiety as the "problem" and may identify that everything would be better if only they could get rid of their anxiety. To assess EA, we recommend that clinicians discuss and assess for EA during the clinical interview and throughout sessions, incorporate experiential practices in session, and use self-report measures.

Clinical Interview

Experiential avoidance can be assessed in multiple ways, including through the clinical interview. Right from the beginning, patients often express EA in

response to questions about why they are seeking treatment (e.g., "I just want to make my anxiety go away," "I want a magic pill so I never have to feel anxious ever again"). Similarly, when asking about what they are avoiding, patients with heightened EA may describe behavioral avoidance due to their anxiety. For example, patients high in EA often use anxiety as an explanation for why they did not do something that is important to them (e.g., "I can't do X because it will make me anxious"). In these conversations, it is helpful to assess whether it is the avoidance of anxiety (EA) that is the direct cause of the behavioral avoidance or if there are other factors also impacting behavior.

Patients who are engaging in EA may be less aware of their emotions and other internal experiences and may have a harder time identifying emotions, thoughts, and physiological sensations. Therefore, it may be helpful to ask questions like

- What happens when you start to feel anxious?
- What thoughts, emotions, action urges do you notice next? Do you try to make sensations go away? What happens when you try to do that?
- Are there things you don't do because doing them would make you feel anxious? What are those things?

Assessment of EA occurs both during an initial assessment and throughout treatment, as it can take a while for patients and therapists to recognize the ways that EA is influencing anxiety. Often EA comes up in the context of discussing suppression and asking the patient about their own experiences with attempts to control (e.g., "What happens when you try to control or avoid your anxiety?"). Asking questions like this can help therapists understand the specific ways that EA may be influencing anxiety.

It is always important to consider the patient's cultural background and how different aspects of identity may influence the messages they have received about emotions, and how they respond to their emotions. While much research has demonstrated negative mental health outcomes related to EA in the United States and Europe, some research conducted in China has demonstrated that EA was not significantly associated with mental health consequences (Soto, Perez, Kim, Lee, & Minnick, 2011), suggesting that cultural context needs to be considered. Clinicians can ask about the patient's cultural background and the messages they received about emotions growing up from family members, friends, and their broader cultural communities. Clinicians can also ask the patient whether they feel like their use of EA is helpful. If someone thinks that it is not harmful, the therapist should further consider the possibility that, in the patient's specific context, EA may not be problematic. Patients from diverse cultural backgrounds may also report that their family members (or others with the same background) seem to use EA without negative consequences, but that they experience consequences with their own use of EA. This can be a challenge for patients and add another layer of self-judgment as they attempt to navigate different cultural messages about emotions and make decisions about what is helpful for them in different contexts.

Experiential Practices

There are also a number of experiential practices that can be used either as an intervention or as an assessment. As an assessment, these exercises can be particularly helpful to further illustrate what is meant by EA, which can be a difficult construct to explain. These exercises can be useful as another method for having patients talk about their experiences with EA and to illustrate the problems with trying to control or suppress internal experiences. The classical example is Wegner's white bear exercise (Wegner et al., 1987), in which one is asked to think about anything as long as it is *not* a white bear. However, the majority of people do end up thinking about white bears despite efforts to suppress this thought. This exercise, or a similar one (e.g., don't think of jelly donuts, don't think of chocolate cake), demonstrates how attempts to control often fail and actually make the occurrence of the thought (or other internal experience) stronger. Similarly, the metaphor of "tug of war with a monster" (Hayes et al., 2012, p. 276) can be another way to demonstrate how letting go of EA (accepting anxiety) can be an alternate option. This metaphor is particularly helpful to show that if we are constantly trying to avoid our internal experiences, we cannot be engaged in the present moment. By asking patients to describe in what ways they are playing tug of war with their anxiety, the therapist can further assess what EA looks like for that specific patient.

Self-Report Measures

As noted previously, it may be hard for some patients who engage in EA to describe their attempts to control their internal experiences, and so it can be helpful to use validated self-report measures in assessing EA. Historically, EA has most often been measured by some version of the Acceptance and Action Questionnaire (AAQ; Bond et al., 2011; Hayes et al., 2004). The original 22-item AAQ can be scored multiple ways (single-factor 16-item version, two-factor 16-item version, and single-factor 9-item version).[3] In response to concerns about the internal consistency and language of the original version of the AAQ (Bond et al., 2011; Gámez et al., 2011, 2014; Schmalz & Murrell, 2010), the AAQ-II[4] (Bond et al., 2011) and several other self-report measures were developed. Please see Table 7.1 for a list of these measures.

Across these self-report measures, some examine EA as a single construct/factor (e.g., nine-item version of the AAQ), while others examine a multidimensional construct (e.g., the Multidimensional Experiential Avoidance Questionnaire and the two-factor 16-item version of the AAQ). Most of these measures are available online or in publications. Some of these measures,

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[3]Some have begun to refer to the AAQ and the AAQ-II as measures of psychological flexibility. As previously mentioned, there is ongoing discussion in the field as to how best define, measure, and differentiate EA and psychological inflexibility.
[4]Some research has found the AAQ-II to be more closely associated with general distress (Wolgast, 2014) or neuroticism and negative affect (Rochefort, Baldwin, & Chmielewski, 2018) versus acceptance.

TABLE 7.1. Self-Report Measures of Experiential Avoidance

Measure	Items	Source
Acceptance and Action Questionnaire	22[a]	Hayes et al., 2004
Acceptance and Action Questionnaire-2	7	Bond et al., 2011
Social Anxiety—Acceptance and Action Questionnaire	19	MacKenzie and Kocovski, 2010
Multidimensional Experiential Avoidance Questionnaire	62	Gámez, Chmielewski, Kotov, Ruggero, and Watson, 2011
The Brief Experiential Avoidance Questionnaire	15	Gámez et al., 2014
The Avoidance and Fusion Questionnaire	17	Schmalz and Murrell, 2010

Note. [a]Different versions of scoring use either 16 or 9 of the 22 items; therefore, items for a specific version could be selected to decrease the total number of items.

including the AAQ and AAQ-II, have been translated and validated in different languages, including Spanish (Barraca Mairal, 2004; Ruiz et al., 2013). A social anxiety-specific version of the AAQ has also been developed (MacKenzie & Kocovski, 2010).

CLINICAL IMPLICATIONS

Experiential avoidance is a transdiagnostic process that appears to contribute to the development and maintenance of anxiety across a range of clinical presentations (Spinhoven, Drost, de Rooij, van Hemert, & Penninx, 2014). Next, we present some ways that EA surfaces across fear- and anxiety-related contexts.

Fear of Negative Evaluations

An individual's fears and concerns about others' judgments and evaluations are central to both social anxiety and body dysmorphic disorder. These fears can be triggered by actual or imagined social situations where the individual believes that they are being observed and evaluated. Models of social anxiety (see Clark & Wells, 1995; Herbert & Cardaciotto, 2005; Rapee & Heimberg, 1997) highlight how individuals with this problem believe there is a performance standard that they are not living up to, and that others are evaluating them negatively for this failure. This is coupled with a negative relationship with internal experiences, where these individuals believe these negatively biased thoughts to be true and judges themselves for not being able to perform differently in the situation, drawing their attention away from the actual situation to focus on negative internal signs of failure rather than external signs of success (see Chapter 12), which then increases anxiety and experiential avoidance. This results in increased behavioral avoidance and reduced opportunities for new learning that social situations may not be dangerous (see Chapter 2). In fact, research has shown that

those diagnosed with social anxiety disorder exhibit more EA compared to those without a diagnosis (Kashdan et al., 2013).

People with fears of negative evaluations, such as May, often become anxious at the idea that others are noticing and/or judging them. Often these social anxiety-related fears include concerns about appearing anxious in front of others due to beliefs that others will judge them for their anxiety or will see their anxiety as a sign that they are incompetent. For example, given May's childhood history of learning that others believe that anxiety is bad, she likely fears the judgments that will come from others who may notice that she is anxious. Given the nature of these fears, individuals with fears of negative evaluations are particularly invested in engaging in EA to avoid appearing anxious to others. In fact, there is some evidence that individuals with social anxiety try to suppress their emotions more than others do (Kashdan & Steger, 2006). However, the failed attempts to control their anxiety, coupled with an over interpretation of how anxious they are appearing to others, continues the cycle of anxiety.

Worry

Worry is the cognitive process of future-focused, negative, and often wide-ranging repeated thought that often leads to anxiety. While worry is most commonly associated with generalized anxiety disorder, it is a transdiagnostic process that can occur across anxiety disorders and is also common in those without diagnosed anxiety (see Chapter 8). Research on the function of worry shows that worry serves as a distraction from more emotional topics (Borkovec & Roemer, 1995). From this perspective, worry serves the function of helping the individual avoid other distressing stimuli and emotions by damping down physiological arousal. In other words, worry can serve as an EA strategy. It functions to help individuals avoid the underlying distress. Research has supported this by showing that excessive worry is associated with EA (Buhr & Dugas, 2012).

In the case of May, there are many situations that may trigger her worry, such as the anticipation of going to a volunteer event, considering what her family and friends may think of her for her involvement in the LGBTQ+ community, and overheard comments about judging others for expressing their emotions. These are clearly distressing thoughts to her, particularly as worry tends to focus on catastrophic outcomes. For example, she may be worried that her family will disown her or that all of her friends will leave her (without evidence that this will be the case). Given that these catastrophic thoughts are highly distressing, May will naturally want to avoid the distress. This EA may include her trying to stop her worry spirals by willing her mind to go blank. However, we rarely are successful in willing our thoughts to slow down, and only end up making them stronger, thus providing evidence that the catastrophic events may occur. Similarly, May's worry may be covering up other emotions (e.g., sadness, grief, anger) that she is trying to suppress, as worry itself can be a form of emotional suppression. It may be that May is

feeling sad and angry with herself that she has been unable to engage with the community in the way she wants. These emotions may be more difficult for May to express than anxiety and worry are.

Fear of Somatic Cues

Fears of somatic cues occur across a range of clinical presentations of anxiety (see Chapter 4). These fears can involve concerns that the physical sensations mean impending death or the presence of a disease such as cancer or multiple sclerosis; or they can be feared because of the discomfort associated with the sensations when they occur—in that escape will not be possible; or they can be feared because of the embarrassment that comes from others noticing the physical manifestations (e.g., sweating, trembling). In these ways, when these internal sensations, emotions, and situations that trigger somatic responses are perceived as threatening, there is a nonacceptance of these sensations and emotions and a strong desire to change them. Underlying these fears is often a sense that this physiological arousal is outside of one's control and is unpredictable.

For example, in panic attacks, the fears are often related to the feeling that panic sensations are coming out of the blue and that the individual is not able to predict them. In fact, panic disorder is characterized by fear of panic, rather than actually having a panic attack. Similarly, agoraphobia is often triggered by the inability to escape the crowd, the elevator, or the movie theater—in other words, not being in control of the situation. When we feel out of control, it is natural to want to exert control over whatever we can. Therefore, there is a natural attempt to try to control the physical sensations, thus engaging in EA. Sometimes these attempts at controlling physical sensations are successful. For example, sometimes taking slow breaths does slow down heart rate; however, particularly as anxiety gets high, we are not able to fully control these sensations. Research has shown that those with a history of uncued panic attacks report more EA than those without this history (Tull & Roemer, 2007). Similarly, those with clinical levels of health anxiety report more EA than those with lower levels of health anxiety (Wheaton, Berman, & Abramowitz, 2010). This may be partially related to the association between anxiety sensitivity and EA. There is a growing body of research on the association between EA and anxiety sensitivity, or the tendency to respond fearfully to physical sensations due to the belief that these sensations could have harmful consequences (Reiss, Peterson, Gursky, & McNally, 1986). While a full review of this literature is beyond the scope of this chapter; there seems to be evidence that EA and anxiety sensitivity are overlapping, yet distinct constructs (see Kämpfe et al., 2012).

In the case of May, we see that she is particularly focused on her increased heart rate and that this increased heart rate means that something is wrong. This is coupled with her belief that she should be able to reduce her heart rate. However, as she tries to reduce her heart rate, through willing herself to calm down, she may be unsuccessful, which provides more evidence that

there is something wrong, which may then increase, rather than decrease her heart rate. In this way, May's attempts at EA paradoxically increase the somatic cues that she is trying to avoid. While this is not what is described in May's case, it is easy to see how this cycle of noticing somatic cues, trying to suppress or avoid them, but paradoxically increasing them could easily lead to a panic attack. She may then become hypervigilant to even slight increases in heart rate, trying to avoid anything that may increase her heart rate, further leading to avoidance of emotions, thoughts, or situations that would lead to an increase in heart rate.

Fear of the Significance or Meaning of Thoughts

Some individuals fear the significance or the meaning of having a particular thought. These fears are related to the obsessions often seen in those diagnosed with obsessive-compulsive disorder (OCD) and the worry seen in generalized anxiety disorder. Obsessions are recurring, intrusive, distressing, unwanted thoughts, images, or impulses that come in to one's mind. Similarly, worry may function to distract individuals away from fear associated with the content or meaning of the underlying thought or other internal experience (Borkovec & Roemer, 1995). Similarly, individuals with both OCD and generalized anxiety disorder often engage in a process where the individual believes that having a thought about an event makes the event more likely to happen (Thompson-Hollands, Farchione, & Barlow, 2013). This is referred to as *thought–action fusion*. This thought–action fusion likely increases the distress of the thought and the motivation to avoid the thought. In response to these unwanted thoughts, images, or impulses, individuals may respond with a particular behavior (e.g., compulsive ritual, avoidance) or with worry to prevent a feared consequence or to reduce anxiety. These behaviors may take the form of a mental ritual, assurance seeking, repeating words or behaviors, distraction through worry, or avoiding things that trigger the thoughts. In this way, Eifert and Forsyth (2005) suggested that these compulsive behaviors are an attempt at EA. In other words, in an attempt to avoid the anxiety and not experience the distress associated with the obsessional beliefs, compulsions may function to avoid or correct for the feared consequence. For example, if an individual has an intrusive thought about their child being hurt while lying in bed at night and they go to check on their child to make sure nothing is wrong, the reassurance-seeking through checking may be an attempt to control and reduce the distress caused by the obsessive thought. Similarly, an individual may engage in EA through worry rather than facing the fear that their negative thoughts are a sign that they will not be able to cope with what is coming.

However, it is important to note that the research is mixed regarding the role of EA in fears of the significance or meaning of thoughts. For example, studies have shown a relationship between EA and symptoms of generalized anxiety disorder (Lee, Orsillo, Roemer, & Allen, 2010; Roemer, Salters, Raffa, & Orsillo, 2005); however, several studies have failed to show a relation

between EA and obsessive-compulsive symptom severity, although there is some understanding that this could be due to measurement issues (see Abramowitz, Lackey, & Wheaton, 2009; Manos et al., 2010). Interestingly, more recent research has found associations between EA and some aspects of obsessive-compulsive symptoms. For example, EA has been shown to predict obsessional symptoms but not other obsessive-compulsive symptoms (Blakey, Jacoby, Reuman, & Abramowitz, 2016). Similarly, EA has been correlated with the unacceptability of thoughts, responsibility for harm, and a desire for symmetry, but not with contamination-based fears (Wetterneck, Steinberg, & Hart, 2014).

Fear of Traumatic Events

Following exposure to a potentially traumatic event or learning about a potentially traumatic event happening to a loved one, many individuals develop strong physiological arousal and fear at reminders of the traumatic event. For some individuals, the reexperiencing aspects of the trauma, avoidance of situations and cues that remind them of the trauma, emotional numbing, and hyperarousal continue and may warrant a diagnosis of posttraumatic stress disorder (PTSD). When there is a traumatic event, it is natural to want to avoid and push away the terror and pain. However, these efforts to avoid and suppress often contribute to the reexperiencing and avoidance characteristic of PTSD. In fact, there is research evidence that the more one is prone to use EA as a coping strategy prior to a traumatic event the more likely one is to develop posttraumatic stress symptomology (Kumpula, Orcutt, Bardeen, & Varkovitzky, 2011).

Additionally, peritraumatic dissociation may serve an EA function in that peritraumatic dissociation serves to avoid and regulate aspects of the trauma experience in an attempt to cope with the experience (see Wagner & Linehan, 1998). By dissociating and removing oneself psychologically from the trauma, the individual is reducing the immediate anxiety and fear of the experience. Like other instances of EA, this initial avoidance may be effective in the short term; however, symptoms often are reexperienced at a later date. In these ways, using EA as a coping strategy following a traumatic event likely contributes to the psychological distress associated with the trauma. For example, if an individual is in a traumatic car accident, they may attempt to suppress any emotions about the accident, which may be helpful in the short term. However, if they continue to try to suppress the emotions, it may contribute to an ongoing cycle of EA where the emotional experience may paradoxically strengthen, thus further increasing their avoidance and other symptoms.

Contextual Stressors

Many individuals face stressors on a regular basis due to discrimination and marginalization based on race, ethnicity, sexual orientation, gender identity and expression, immigration status, religion, class, and disability status. These

chronic experiences of discrimination and marginalization may lead to a battle fatigue that includes increased anxiety and worry as well as physical health consequences. While the effect of discrimination on anxiety is multi-faceted, EA can be part of this pattern. For example, in the face of chronic experiences of marginalization, it is natural to have strong emotions that we then want to suppress or avoid. Additionally, individuals with a minority status are often subtly (or not so subtly) told to suppress, ignore, or doubt aspects of their experience. This is particularly true of microaggressions where individuals are often told that their emotions and fear in response to these experiences is unjustified and that they should ignore it. Similarly, the individual also often criticizes themselves for being distressed, saying that they should just be able to cope with it because "it wasn't a big deal." In these ways, the individual is employing EA in the face of these experiences. In some situations, it is adaptive to control and suppress our emotional responses; however, as we have discussed above, denying, suppressing, and trying to avoid the emotion associated with these experiences likely increases anxiety and worry in the future. In fact, recent research has found EA to moderate the relations between past year frequency of discrimination and depressive symptoms, and stress appraisal of discrimination and symptoms of anxiety (Martinez, Eustis, Arbid, Graham-LoPresti, & Roemer, 2018), indicating that experiences with discrimination combined with high levels of EA may increase mental health symptoms, and that EA may be an important target to consider in treatment.

In the case of May, we are aware that she has multiple marginalized identities (her identity as Asian-American and as queer). Given these identities, she likely experiences both racial and sexual orientation microaggressions. This may be an added burden that gets in the way of May engaging in events. For example, if she believes that she will experience microaggressions related to race if she attends the LGBTQ+ advocacy group and that these experiences will lead her to experience additional emotions, including increased anxiety, then she will likely avoid attending such events. Similarly, denying that her experiences of discrimination and marginalization have an impact on her may make her even more reactive to her internal experiences, further exacerbating her desire to engage in EA, and therefore further perpetuating her cycle of anxiety.

Procrastination

Procrastination is often a concern of patients presenting with clinical and non-clinical anxiety. Procrastination is often a presenting concern for many working in a college counseling setting, and procrastination can occur along with other anxiety disorders, particularly generalized anxiety disorder and social anxiety disorder, making it difficult to move forward on necessary tasks (e.g., job applications, scheduling doctor's appointments, making phone calls required for work). While there are currently multiple theories regarding the function of procrastination, there is growing evidence that procrastination is

related to task-related anxieties (Fritzsche, Young, & Hickson, 2003) and fears of failure (Beck, Koons, & Milgrim, 2000). From this perspective, procrastination may be serving an EA function as the delaying of a task allows individuals to avoid the anxiety and fears that arise as they approach the task. In trying to approach a task, they may experience anxiety related to their fears of not being able to complete the task along with fears about what it would mean to not complete the task. Sometimes this may be coupled with the sense that they have to be less anxious before they can approach the task. As a result, they may put off the task until they are feeling less anxious about it. However, the longer they put off the task, the more pressure there is to complete the task and the harder it is to even approach it. In this way, procrastination is serving an avoidant function, as engaging in procrastination is avoiding the short-term discomfort and anxiety that arise when thinking about the task. In fact, research has shown that the closely related construct of psychological inflexibility was associated with procrastination and predicted procrastination over and above trait anxiety (Glick, Millstein, & Orsillo, 2014).

CONCLUSION

Experiential avoidance, or the unwillingness to remain in contact with distressing internal experiences along with the attempts to control or avoid distressing internal experiences, has been associated with a range of psychopathological symptoms across a range of clinical presentations of anxiety and fear. These attempts to control internal experiences (e.g., thoughts, emotions, physiological sensations, memories) can exacerbate distress and limit behavior. The flexible use of EA can be adaptive in certain contexts; it is when EA becomes habitual, rigid, and/or automatic that it can lead to significant distress and/or impairment in people's lives. This chapter positioned EA within an acceptance-based behavioral model of anxiety with a particular focus on how EA is strengthened and maintained through negative and judgmental thoughts, failed attempts at suppression of anxiety, and the consequences of avoidance. EA has been linked with fear of negative evaluations, worry, fear of somatic cues, fear of the significance or meaning of thoughts, fear of traumatic events, contextual stressors, and procrastination. This chapter used the term "experiential avoidance" throughout; however, some in the field are moving to the broader term of "psychological inflexibility." EA is often referred to, particularly in the treatment literature, through its opposing process of psychological flexibility or acceptance, the process of allowing internal experiences to come and go without trying to change them. EA is a promising construct for research on transdiagnostic models of anxiety, and it appears to be an important construct to target in treatment. However, more research is needed to fully understand the role that EA plays in maintaining distress, so that treatment can better target and reduce the impact of EA on patients' lives.

REFERENCES

Abramowitz, J. S., Lackey, G. R., & Wheaton, M. G. (2009). Obsessive–compulsive symptoms: The contribution of obsessional beliefs and experiential avoidance. *Journal of Anxiety Disorders, 23,* 160–166. http://dx.doi.org/10.1016/j.janxdis.2008.06.003

Barraca Mairal, J. (2004). Spanish adaptation of the Acceptance and Action Questionnaire (AAQ). *International Journal of Psychology & Psychological Therapy, 4,* 505–515. Retrieved from https://www.ijpsy.com/volumen4/num3/97/spanish-adaptation-of-the-acceptance-and-EN.pdf

Beck, B. L., Koons, S. R., & Milgrim, D. L. (2000). Correlates and consequences of behavioral procrastination: The effects of academic procrastination, self-consciousness, self-esteem and self-handicapping. *Journal of Social Behavior and Personality, 15,* 3–13.

Blakey, S. M., Jacoby, R. J., Reuman, L., & Abramowitz, J. S. (2016). The relative contributions of experiential avoidance and distress tolerance to OC symptoms. *Behavioural and Cognitive Psychotherapy, 44,* 460–471. http://dx.doi.org/10.1017/S1352465815000703

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., . . . Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy, 42,* 676–688. http://dx.doi.org/10.1016/j.beth.2011.03.007

Borkovec, T. D., & Roemer, L. (1995). Perceived functions of worry among generalized anxiety disorder subjects: Distraction from more emotionally distressing topics? *Journal of Behavior Therapy and Experimental Psychiatry, 26,* 25–30. http://dx.doi.org/10.1016/0005-7916(94)00064-S

Buhr, K., & Dugas, M. J. (2012). Fear of emotions, experiential avoidance, and intolerance of uncertainty in worry and generalized anxiety disorder. *International Journal of Cognitive Therapy, 5,* 1–17. http://dx.doi.org/10.1521/ijct.2012.5.1.1

Campbell-Sills, L., Barlow, D. H., Brown, T. A., & Hofmann, S. G. (2006). Effects of suppression and acceptance on emotional responses of individuals with anxiety and mood disorders. *Behaviour Research and Therapy, 44,* 1251–1263. http://dx.doi.org/10.1016/j.brat.2005.10.001

Chodron, P. (2007). *Practicing peace in times of war.* Boston, MA: Shambhala.

Clark, D. M., & Wells, A. A. (1995). A cognitive model of social phobia. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 69–93). New York, NY: Guilford Press.

Eifert, G. H., & Forsyth, J. P. (2005). *Acceptance and commitment therapy for anxiety disorders: A practitioner's treatment guide to using mindfulness, acceptance, and values-based behavior change strategies.* Oakland, CA: New Harbinger.

Fritzsche, B. A., Young, B. R., & Hickson, K. C. (2003). Individual differences in academic procrastination tendency and writing success. *Personality and Individual Differences, 35,* 1549–1557. http://dx.doi.org/10.1016/S0191-8869(02)00369-0

Gámez, W., Chmielewski, M., Kotov, R., Ruggero, C., Suzuki, N., & Watson, D. (2014). The brief experiential avoidance questionnaire: Development and initial validation. *Psychological Assessment, 26,* 35–45. http://dx.doi.org/10.1037/a0034473

Gámez, W., Chmielewski, M., Kotov, R., Ruggero, C., & Watson, D. (2011). Development of a measure of experiential avoidance: The Multidimensional Experiential Avoidance Questionnaire. *Psychological Assessment, 23,* 692–713. http://dx.doi.org/10.1037/a0023242

Germer, C. K. (2005). Anxiety disorders: Befriending fear. In C. K. Germer, R. D. Siegel, & P. R. Fulton (Eds.), *Mindfulness and psychotherapy* (1st ed.), (pp. 152–172). New York, NY: Guilford Press.

Glick, D. M., Millstein, D. J., & Orsillo, S. M. (2014). A preliminary investigation of the role of psychological inflexibility in academic procrastination. *Journal of Contextual Behavioral Science, 3,* 81–88. http://dx.doi.org/10.1016/j.jcbs.2014.04.002

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012). *Acceptance and commitment therapy: The process and practice of mindful change* (2nd ed.). New York, NY: Guilford Press.

Hayes, S. C., Strosahl, K. D., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., . . . McCurry, S. M. (2004). Measuring experiential avoidance: A preliminary test of a working model. *The Psychological Record, 54*, 553–578. http://dx.doi.org/10.1007/BF03395492

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experimental avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64*, 1152–1168. http://dx.doi.org/10.1037/0022-006X.64.6.1152

Herbert, J. D., & Cardaciotto, L. A. (2005). An acceptance and mindfulness-based perspective on social anxiety disorder. In S. M. Orsillo & L. Roemer (Eds.), *Acceptance and mindfulness-based approaches to anxiety* (pp. 189–212). New York, NY: Springer. http://dx.doi.org/10.1007/0-387-25989-9_8

Herzberg, K. N., Sheppard, S. C., Forsyth, J. P., Credé, M., Earleywine, M., & Eifert, G. H. (2012). The Believability of Anxious Feelings and Thoughts Questionnaire (BAFT): A psychometric evaluation of cognitive fusion in a nonclinical and highly anxious community sample. *Psychological Assessment, 24*, 877–891. http://dx.doi.org/10.1037/a0027782

Kämpfe, C. K., Gloster, A. T., Wittchen, H.-U., Helbig-Lang, S., Lang, T., Gerlach, A. L., . . . Deckert, J. (2012). Experiential avoidance and anxiety sensitivity in patients with panic disorder and agoraphobia: Do both constructs measure the same? *International Journal of Clinical and Health Psychology, 12*, 5–22. Retrieved from https://www.redalyc.org/html/337/33723707001/

Kashdan, T. B., Farmer, A. S., Adams, L. M., Ferssizidis, P., McKnight, P. E., & Nezlek, J. B. (2013). Distinguishing healthy adults from people with social anxiety disorder: Evidence for the value of experiential avoidance and positive emotions in everyday social interactions. *Journal of Abnormal Psychology, 122*, 645–655. http://dx.doi.org/10.1037/a0032733

Kashdan, T. B., & Steger, M. F. (2006). Expanding the topography of social anxiety. An experience-sampling assessment of positive emotions, positive events, and emotion suppression. *Psychological Science, 17*, 120–128. http://dx.doi.org/10.1111/j.1467-9280.2006.01674.x

Kumpula, M. J., Orcutt, H. K., Bardeen, J. R., & Varkovitzky, R. L. (2011). Peritraumatic dissociation and experiential avoidance as prospective predictors of posttraumatic stress symptoms. *Journal of Abnormal Psychology, 120*, 617–627. http://dx.doi.org/10.1037/a0023927

Lee, J. K., Orsillo, S. M., Roemer, L., & Allen, L. B. (2010). Distress and avoidance in generalized anxiety disorder: Exploring the relationships with intolerance of uncertainty and worry. *Cognitive Behaviour Therapy, 39*, 126–136. http://dx.doi.org/10.1080/16506070902966918

MacKenzie, M. B., & Kocovski, N. L. (2010). Self-reported acceptance of social anxiety symptoms: Development and validation of the Social Anxiety—Acceptance and Action Questionnaire. *International Journal of Behavioral Consultation and Therapy, 6*, 214–232. http://dx.doi.org/10.1037/h0100909

Manos, R. C., Cahill, S. P., Wetterneck, C. T., Conelea, C. A., Ross, A. R., & Riemann, B. C. (2010). The impact of experiential avoidance and obsessive beliefs on obsessive–compulsive symptoms in a severe clinical sample. *Journal of Anxiety Disorders, 24*, 700–708. http://dx.doi.org/10.1016/j.janxdis.2010.05.001

Martinez, J. H., Eustis, E. H., Arbid, N., Graham-LoPresti, J. R., & Roemer, L. (2018). *Impact of experiential avoidance in the relation between racial discrimination and negative mental health outcomes*. Manuscript in preparation.

Purdon, C. (1999). Thought suppression and psychopathology. *Behaviour Research and Therapy, 37*, 1029–1054. http://dx.doi.org/10.1016/S0005-7967(98)00200-9

Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy, 35*, 741–756. http://dx.doi.org/10.1016/S0005-7967(97)00022-3

Reiss, S., Peterson, R. A., Gursky, D. M., & McNally, R. J. (1986). Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. *Behaviour Research and Therapy, 24*, 1–8. http://dx.doi.org/10.1016/0005-7967(86)90143-9

Rochefort, C., Baldwin, A. S., & Chmielewski, M. (2018). Experiential avoidance: An examination of the construct validity of the AAQ-II and MEAQ. *Behavior Therapy, 49*, 435–449. http://dx.doi.org/10.1016/j.beth.2017.08.008

Roemer, L., & Borkovec, T. D. (1994). Effects of suppressing thoughts about emotional material. *Journal of Abnormal Psychology, 103*, 467–474. http://dx.doi.org/10.1037/0021-843X.103.3.467

Roemer, L., & Orsillo, S. M. (2014). An acceptance-based behavioral therapy for generalized anxiety disorder. In D. H. Barlow (Ed.), *Clinical handbook of psychological disorders, 5th Edition: A step-by-step treatment manual* (pp. 206–236). New York, NY: Guilford Press.

Roemer, L., Salters, K., Raffa, S. D., & Orsillo, S. M. (2005). Fear and avoidance of internal experiences in GAD: Preliminary tests of a conceptual model. *Cognitive Therapy and Research, 29*, 71–88. http://dx.doi.org/10.1007/s10608-005-1650-2

Ruiz, F. J., Langer Herrera, A. I., Luciano, C., Cangas, A. J., & Beltrán, I. (2013). Measuring experiential avoidance and psychological inflexibility: The Spanish version of the Acceptance and Action Questionnaire - II. *Psicothema, 25*, 123–129. Retrieved from http://www.psicothema.com/english/psicothema.asp?id=4090

Schmalz, J. E., & Murrell, A. R. (2010). Measuring experiential avoidance in adults: The Avoidance and Fusion Questionnaire. *International Journal of Behavioral Consultation and Therapy, 6*, 198–213. http://dx.doi.org/10.1037/h0100908

Soto, J. A., Perez, C. R., Kim, Y.-H., Lee, E. A., & Minnick, M. R. (2011). Is expressive suppression always associated with poorer psychological functioning? A cross-cultural comparison between European Americans and Hong Kong Chinese. *Emotion, 11*, 1450–1455. http://dx.doi.org/10.1037/a0023340

Spinhoven, P., Drost, J., de Rooij, M., van Hemert, A. M., & Penninx, B. W. (2014). A longitudinal study of experiential avoidance in emotional disorders. *Behavior Therapy, 45*, 840–850. http://dx.doi.org/10.1016/j.beth.2014.07.001

Thompson-Hollands, J., Farchione, T. J., & Barlow, D. H. (2013). Thought-action fusion across anxiety disorder diagnoses: Specificity and treatment effects. *The Journal of Nervous and Mental Disease, 201*, 407–413. http://dx.doi.org/10.1097/NMD.0b013e31828e102c

Tull, M. T., & Roemer, L. (2007). Emotion regulation difficulties associated with the experience of uncued panic attacks: Evidence of experiential avoidance, emotional nonacceptance, and decreased emotional clarity. *Behavior Therapy, 38*, 378–391. http://dx.doi.org/10.1016/j.beth.2006.10.006

Wagner, A. W., & Linehan, M. M. (1998). Dissociative behavior. In V. M. Follette, J. I. Ruzek, & F. R. Abueg (Eds.), *Cognitive-behavioral therapies for trauma* (pp. 191–225). New York, NY: Guilford Press.

Wegner, D. M., Schneider, D. J., Carter, S. R., III, & White, T. L. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology, 53*, 5–13. http://dx.doi.org/10.1037/0022-3514.53.1.5

Wetterneck, C. T., Steinberg, D. S., & Hart, J. (2014). Experiential avoidance in symptom dimensions of OCD. *Bulletin of the Menninger Clinic, 78*, 253–269. http://dx.doi.org/10.1521/bumc.2014.78.3.253

Wheaton, M. G., Berman, N. C., & Abramowitz, J. S. (2010). The contribution of experiential avoidance and anxiety sensitivity in the prediction of health anxiety. *Journal of Cognitive Psychotherapy, 24*, 229–239. http://dx.doi.org/10.1891/0889-8391.24.3.229

Wolgast, M. (2014). What does the Acceptance and Action Questionnaire (AAQ-II) really measure? *Behavior Therapy, 45*, 831–839. http://dx.doi.org/10.1016/j.beth.2014.07.002

8

Worry and Rumination

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Maria, a 28-year-old Latina American woman, presents with somatic symptoms of anxiety (e.g., muscle tension, headaches, gastrointestinal disturbance) and intermittent depression. Despite her initial emphasis on somatic concerns, assessment reveals diffuse distress about many domains. Specifically, she reports perseverative thoughts about whether her part-time online business will fail. Maria also spends hours worrying about the adequacy of education for her two elementary school-age children and her own competence as a parent, given her own developmental history of neglect. Moreover, she routinely questions her balance of work and parenting. In her marriage, she ruminates about whether she had found the right husband, given their personality differences. At her worst, she feels unable to stop thinking about such issues, wondering if it makes her physically ill. Maria's chronic preoccupation with these domains feeds symptoms of anxiety and irritability, occasional panic attacks, shame, and at times, suicidal ideation. She copes with negative emotions by alternating between avoiding direct problem-solving (e.g., completing taxes for her business, seeking help) and perfectionistic overcommitment. Expecting that others would not support her, she chronically takes care of others' needs but avoids disclosing her needs to her husband or friends. This leads to resentment punctuated by occasional angry complaints—followed by apologetic, passive behavior. Although Maria possesses the important strengths of resilience and determination, she reports a recurring sense of a life spinning out of control.[1]

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[1]All clinical case material has been altered to protect patient confidentiality.

Examination of Maria's presentation suggests that perseverative negative thoughts occupy a central place in her life. *Worry*—traditionally conceptualized as the verbal–linguistic, future-oriented anticipation of potential threats (Borkovec, Robinson, Pruzinsky, & DePree, 1983)—represents a pervasive process for her. She spends hours daily mired in thoughts about whether negative outcomes will occur in her family and work, contributing to anxiety, other negative emotions, and somatic symptoms. In addition, in line with the fact that some patients succumb to negative thinking *about* negative thinking or its consequences (i.e., metaworry; Wells, 2006), Maria worries that worry itself may pose a risk for her mental and physical health.

Maria also suffers from chronic *rumination*, originally defined as perseverative thinking about one's problems and associated feelings (Nolen-Hoeksema, 1991). It often entails attempts to make sense of past failures to meet goals by repeatedly asking oneself mental questions unlikely to be solvable by such mentation (e.g., "Why did that happen to me?" "What's wrong with me?" "Why can't I fix this?"). As with worry, preservative negative thoughts typify rumination. Maria incessantly questions her past decisions about marriage, parenting, and work—dwelling on events, their consequences, and concomitant feelings. Such rumination invariably elicits dysphoria and, at worst, suicidal ideation.

In this chapter, we consider the role that worry and rumination play as transdiagnostic maintenance factors for anxiety. We discuss conceptual models of (a) how these processes may promote distress, (b) relevant assessment methods, and (c) clinical application to a range of symptoms.

CONCEPTUAL IMPLICATIONS

Initial conceptual models of worry and rumination implied specificity to particular psychological disorders. Namely, excessive and uncontrollable worry represents the cardinal symptom of generalized anxiety disorder (GAD; American Psychiatric Association, 2013), and many conceptual models posit a unique role for worry in the cause and maintenance of generalized anxiety. However, worry functions as a continuous dimension rather than a process circumscribed to GAD (Ruscio, Borkovec, & Ruscio, 2001). Similarly, empirical approaches to rumination historically conceptualized it as a cognitive process that perpetuates depressive symptoms (e.g., Nolen-Hoeksema, 2000). However, measures of worry and rumination exhibit consistently strong positive correlations (e.g., McEvoy, Mahoney, & Moulds, 2010), and both worry (Startup & Erickson, 2006) and rumination (e.g., Fresco, Frankel, Mennin, Turk, & Heimberg, 2002) have been linked to a broad range of symptoms. Furthermore, as we discuss below (see Assessment), it remains unclear to what extent most measures of worry and rumination show specificity to the theorized constructs. Szkodny and Newman (2017) argued that unique associations of worry and rumination to respective syndromal symptoms represent method variance, warranting caution against making claims of specificity.

Nonetheless, the strong correlation of worry and rumination, as well as their underlying dimensions (Szkodny & Newman, 2017), supports conceptualizing them as overlapping transdiagnostic processes of repetitive negative thinking (RNT) that transcend diagnostic categories, meriting consideration of how such mechanisms may contribute to emotional difficulties.

We note the existence of other species of repetitive negative thoughts, such as obsessions (a core feature of obsessive-compulsive disorder [OCD]) and intrusive trauma memories in the context of posttraumatic stress. Obsessions represent intrusive, unwanted negative thoughts (e.g., about contamination, asymmetry, doubt, morally "inappropriate" content) that cause distress and concomitant urges toward neutralizing them by other thoughts or behaviors (e.g., compulsions). Intrusive trauma memories reflect unwanted recollections of traumatic events. Like worry and rumination, these cognitions feature persistent negative content and cause distress. However, relative to obsessions, worry may involve more verbal (rather than imagery-based) content, more ego-syntonic features (i.e., less discordant with ideal self; Szkodny & Newman, 2017), and less ease of neutralization (Langlois, Freeston, & Ladouceur, 2000). Rumination appears to involve more dwelling on the past relative to obsessions (Szkodny & Newman, 2017), and longer duration, less sensory experience, and more shame relative to intrusive trauma memories (Speckens, Hackmann, Ehlers, & Cuthbert, 2007). Obsessions and intrusive memories seem to constitute cognitions to which individuals *react*, whereas worry and rumination have been conceptualized as ways of *coping* that may perpetuate distress.

Although research must further clarify the shared and unique functions of all types of RNT, our emphasis on anxiety maintenance factors limits our focus to worry and rumination, for which there exist more established theories and research on this role. Next, we suggest that worry and rumination entail negative, perseverative thinking that may contribute to psychopathology by direct activation of negative emotional and physiological states, serving strategic functions, impairing problem-solving, and disrupting interpersonal support.

Negative Valence and Promotion of Unpleasant Emotional and Physiological States

An obvious shared feature of worry and rumination lies in their shared negative affective valence. Although individuals may ruminate about positive experiences, typically rumination involves brooding about negative experiences, and worry centers on potential occurrence of stressful events (Borkovec et al., 1983). Worry and rumination may not be identical, given that experimental engagement in rumination elicited sadness, whereas worry elicited anxious mood (e.g., McLaughlin, Borkovec, & Sibrava, 2007). Theoretically, *temporal focus* discriminates worry (on future threats) from rumination (about past failures; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Expecting the worst (future-oriented) did uniquely predict higher GAD but not depressive

symptoms, although extant worry and rumination measures may not consistently differ on temporal focus (Szkodny & Newman, 2017); nonetheless, they jointly emphasize negative content.

Aside from the shared descriptive feature of negative valence, conceptual models posit that worry and rumination foster negative emotion as well as unpleasant physiological activation. For instance, higher self-reported worry predicted negative emotion in naturalistic contexts (e.g., Crouch, Lewis, Erickson, & Newman, 2017) and heightened sympathetic nervous system activation (e.g., Pieper, Brosschot, van der Leeden, & Thayer, 2010). Furthermore, experimental worry inductions elicited negative emotions (e.g., Llera & Newman, 2010) as well as higher sympathetic and lower parasympathetic nervous system responses compared with baseline and relaxation (e.g., Llera & Newman, 2010, 2014). Similarly, self-reported rumination prospectively predicted onset of depressive disorders and prolongation of episodes (e.g., Nolen-Hoeksema, 2000). Focusing on causes, meanings, and consequences of feelings caused dysphoric mood states (e.g., Nolen-Hoeksema & Morrow, 1993), and chronic ruminators experienced greater amygdala reactivity to unpleasant stimuli (Ray et al., 2005).

For Maria, worry and rumination feed her proneness toward distress. Worrying about her online business and her children's education serves to intensify anxiety, somatic activation (e.g., muscle tension, gastrointestinal disturbance), and dysphoria. Similarly, ruminating about her choice of spouse and the intractability of work–life balance only exacerbates her negative moods. Thus, worry and rumination directly contribute to her negative emotional experiences.

Perseverative Cognition and Prolongation of Negative Thoughts

Perseverative self-focused cognition typifies both worry and rumination. Interestingly, the etymology of each term implies repetition: cows *ruminate* by repeatedly chewing and regurgitating grass, whereas a dog may *worry* a bone by incessant gnawing. Indeed, some experts have conceptualized worry and rumination as facets of a higher order process of perseverative or repetitive negative thinking (Ehring & Watkins, 2008; Segerstrom et al., 2012) with transdiagnostic relevance (Arditte, Shaw, & Timpano, 2016). Repetitive attentional focus on negative content may generate and amplify negative mood states, as patients often find it subjectively difficult to disengage from the process. Individuals may experience worry as "uncontrollable" not only in GAD but also beyond this diagnosis. Analogously, individuals who ruminate find it difficult to inhibit negative emotional information (e.g., Joormann, 2006). On one hand, individuals may possess metacognitive beliefs that worrying is interminable or dangerous (Wells, 2006), implying ego-dystonic features. Conversely, they often possess positive beliefs about RNT, implying ego-syntonic features that might facilitate perseveration. For instance, they may believe that worry facilitates problem-solving, helps them prepare for the

worst, and means that they care (e.g., Hebert, Dugas, Tulloch, & Holowka, 2014) or that worry helps them avoid further shifts into negative moods (Newman & Llera, 2011). Some people believe that rumination confers insight about disappointments (Watkins & Baracaia, 2002) and thus helps them to prevent or even solve problems (Papageorgiou & Wells, 2001).

Maria chronically perseverates about her family and work. In line with the foregoing discussion of metacognition, Maria believes that she is unable to terminate RNT, and worries about concomitant health risks. However, she states that she has "always been a worrier" and describes RNT as a "comfortable" and familiar way of coping, suggesting ego-syntonic features of perseveration, despite the fact that it promotes ongoing distress.

Worry and Rumination Serve Cognitive–Affective Functions

Some theories posit that rumination and worry differ in the psychological *functions* that they serve. For instance, worry, as a verbal–linguistic process, has been theorized to help individuals avoid negative imagery and thereby avoid negative emotional experience (e.g., Borkovec, Alcaine, & Behar, 2004), or perhaps to avoid or reduce uncertainty (Koerner & Dugas, 2006). However, the preponderance of evidence suggests that worry *promotes*—not *avoids*—negative emotion (Newman, Llera, Erickson, Przeworski, & Castonguay, 2013). The contrast avoidance model acknowledges but modifies previous theories, suggesting that individuals prone to chronic worry are acutely sensitive to *negative emotional contrasts* (sharp shifts from neutral or positive moods into negative ones). Second, patients with GAD may worry deliberately in order to maintain negative mood and thereby avoid further increase of negative emotion (not avoiding negative emotion per se). This may reduce a specific form of uncertainty: whether one will experience unexpected mood shifts. Experimental (Llera & Newman, 2010, 2014) and longitudinal studies (Crouch et al., 2017) support the model, and contrast avoidance in worry is germane to GAD and transdiagnostically (Llera & Newman, 2017).

In contrast, although individuals may believe that they ruminate to gain insight into past disappointments, rumination may keep them mentally occupied, thereby avoiding having to engage with tasks they find aversive. Moreover, when people ruminate, they mentally compile evidence that their situations are hopeless, increasing certainty that problem-solving efforts are pointless, justifying passivity, avoidance of action, and giving up goals (Nolen-Hoeksema et al., 2008). Individuals may worry when feeling uncertain about future threats but shift to rumination when feeling more certain about uncontrollability or hopelessness regarding stressors.

Although unique functions of worry and rumination remain possible, they similarly involve generation of a negative state. However, because most worries or postevent concerns rarely come true, when the feared event does not occur, repetitive thinking is negatively reinforced, interfering with extinction. Both cognitive processes serve an "evidentiary" function; they presume a

cognitive need to experience subjective certainty about the self or one's outcomes related to stressors. Predicting and understanding threats, though differing in temporal focus, both serve a motive for cognitive consistency, even if such consistency comes at an emotional price (e.g., when individuals gravitate toward negative feedback because it fits self-perceptions; Swann & Read, 1981). Patients may find it less aversive to engage in RNT that increases certainty of negative outcomes than to live out their values without certainty about the self or future. This characterization fits Maria, in that she endorses finding it easier to retreat into mental rumination than to actually face her fears about her marriage and parenting. Additionally, further assessment revealed a fear of negative emotional contrasts ("I can't stand it when I'm having a good day and then my kids act up and upset me") and use of worry to avoid negative contrasts ("I expect the worst so I am not surprised when bad things happen"). Her procrastination about completing taxes, hesitancy to seek or disclose the need for help, and perfectionistic overcommitment also represent negatively reinforced avoidance strategies.

Worry and Rumination Impair Problem-Solving

Worry and rumination may also perpetuate distress by interfering with problem-solving. Rather than taking direct action, repetitive engagement in negative thinking monopolizes cognitive resources and keeps individuals from taking constructive action to improve their lives. Indeed, worry has been linked to impaired confidence in problem-solving (e.g., Dugas, Letarte, Rhéaume, Freeston, & Ladouceur, 1995), rumination inductions reduced confidence and generation of solutions (Lyubomirsky, Tucker, Caldwell, & Berg, 1999), and chronic rumination predicted avoidance of acting on health problems (Lyubomirsky, Kasri, Chang, & Chung, 2006). In Maria's life, worry and rumination preempt direct problem-solving in work and family challenges. She believes that prolonged *thinking about her problems* constitutes taking action, promoting withdrawal and inaction rather than curiosity and approach behavior. Moreover, like many chronic worriers, she may believe that if she worries or ruminates enough, it may prepare her to problem solve or help her arrive at an ideal solution, despite evidence to the contrary in her life.

Negative Impact on Interpersonal Processes

Moreover, individuals who habitually worry and ruminate tend to experience interpersonal problems that may further maintain distress and symptoms (Newman & Erickson, 2010; Nolen-Hoeksema et al., 2008). For instance, chronic worry correlated with self-reported affiliative or "warm" interpersonal traits, daily behavior, and interpersonal problems (e.g., being overly nurturant; Erickson et al., 2016), and rumination has similarly predicted self-perceptions of excessively warm or dependent traits (e.g., Nolen-Hoeksema & Jackson, 2001). Such individuals may believe that perseverative thinking represents friendly concern ("I only worry because I care so much"). Nevertheless, worry

and rumination may translate into maladaptive interpersonal impacts on others. Worry was associated with misjudging one's interpersonal impact on interactions with confederates (Erickson & Newman, 2007) and significant others (Erickson et al., 2016). In turn, problematic interpersonal goals predicted increases in worry over time (e.g., Erickson et al., 2018). Similarly, rumination has predicted conflict and diminished support from others (e.g., Nolen-Hoeksema & Davis, 1999). Individuals may *coruminate* (ruminate aloud with others), providing an aversive social experience for others (Stone, Hankin, Gibb, & Abela, 2011). Thus, RNT may unintentionally contribute to erosion of social support, causing further distress.

Maria illustrates these processes in that she worries about others, prompting an interpersonal style of anxious caregiving that is endearing at times, but inflexible. Negative thinking takes the place of straightforward "owning of" and disclosing her emotional needs, eventually giving way to resentful outbursts. However, even then, ensuing feelings of shame motivate retreat into passivity and worry instead of a healthy balancing of her and others' needs.

In summary, worry and rumination reflect transdiagnostic cognitive mechanisms that maintain dysfunction. They directly increase negative emotion and a sense of being "stuck" in negative thoughts. Indirectly, they feed psychopathology by thwarting problem-solving and adaptive social behavior.

ASSESSMENT

Self-Report Inventories

Over the past 3 decades, a bevy of relevant self-report measures has emerged. We briefly note some of them here (see Table 8.1), as well as reasons for caution about them. With regard to worry, the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990) is the most widely used measure (Startup & Erickson, 2006), and brief versions exist (e.g., Berle et al., 2011), as well as versions for older adults (Hopko et al., 2003) and youth (Chorpita, Tracey, Brown, Collica, & Barlow, 1997). Other measures assess worry domains (Tallis, Davey, & Bond, 1994) and reasons for worry (Hebert et al., 2014). Related instruments assess metacognitive beliefs about worry (Cartwright-Hatton & Wells, 1997) and worrying to avoid negative emotional contrasts (Llera & Newman, 2017).

Other measures were designed to target rumination. The Ruminative Response Scale of the Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991) is used widely, and a subsequent version reduced item overlap with depression (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Other measures assess anger rumination (Sukhodolsky, Golub, & Cromwell, 2001), "postevent processing" about embarrassing interactions (particularly relevant to social anxiety; McEvoy & Kingsep, 2006), and positive beliefs about rumination (Papageorgiou & Wells, 2001).

Assessment of general RNT provides another alternative. Highlighting shared phenomena may sometimes streamline assessment and intervention when

TABLE 8.1. Selected Self-Report Measures of Repetitive Negative Thinking

Measure	Constructs putatively assessed, number of items	Reference
Penn State Worry Questionnaire	Pathological worry; 16 items	Meyer et al. (1990)
Brief Measure of Worry Severity	Pathological worry; 8 items	Gladstone et al. (2005)
Worry Domains Questionnaire	Content-specific worry domains (i.e., relationships, lack of confidence, aimless future, financial issues, and work); 25 items	Tallis et al. (1994)
Why Worry-II	Reasons for worrying (5 subscales); 25 items	Hebert et al. (2014)
Contrast-Avoidance Questionnaire-Worry	Worrying to avoid negative emotional contrast, create negative emotion, facilitate positive contrasts; 30 items	Llera and Newman (2017)
Meta-Cognitions Questionnaire	Positive and negative beliefs about worry; 30 items	Wells and Cartwright-Hatton (2004)
Ruminative Response Scale	Brooding/rumination; 22 items	Nolen-Hoeksema and Morrow (1991)
Rumination-Reflection Questionnaire	Rumination and reflection; 24 items	Trapnell and Campbell (1999)
Rumination on Sadness Scale	Rumination when feeling "sad, down, or blue"; 13 items	Conway, Csank, Holm, and Blake (2000)
Anger Rumination Scale	Rumination on angry moods, anger-provoking memories, causes and consequences of anger states; 19 items	Sukhodolsky et al. (2001)
Positive Beliefs About Rumination Scale	Beliefs about the benefits of rumination; 9 items	Papageorgiou and Wells (2001)
Post-Event Processing Questionnaire-Revised	Repetitive negative thinking following a distressing event; 14 items	McEvoy and Kingsep (2006)
Repetitive Thinking Questionnaire	Repetitive negative thinking (disorder-specific content removed); 27 items (plus 4 "absence of repetitive thinking" items)	McEvoy et al. (2010)
Perseverative Thinking Questionnaire	Repetitive negative thinking, independent of content; 15 items	Ehring et al. (2011)
Perseverative Cognitions Questionnaire	Lack of controllability, preparing for the future, expecting the worst, searching for causes/meaning, dwelling on the past, and thinking discordant with ideal self; 45 items	Szkodny and Newman (2017)

Note. All measures pertain to some form of repetitive negative thinking. However, with the exception of the Perseverative Cognitions Questionnaire, it remains unclear whether measures provide valid measures specifically of worry and rumination per se given concerns noted in the Assessment section in the text.

the clinical focus is generalized perseveration rather than a specific species of negative thought. For instance, Ehring et al. (2011) and McEvoy et al. (2010) developed measures of perseverative negative thinking. Alternatively, this approach may sometimes lack specificity in patients endorsing only particular types of RNT (e.g., only dwelling on the past but not worrying about the future), given the possibility that worry or rumination may differentially promote anxiety and depression (Yang et al., 2014).

However, we caution practitioners that the self-report measures of these constructs may not necessarily assess the theorized constructs in an unambiguous fashion, for several reasons outlined by Szkodny and Newman (2017). First, differences between worry and rumination may be confounded with item content (e.g., focusing on perceived uncontrollability of the thoughts vs. causes and consequences of thoughts). Second, measures may use terms indiscriminately (e.g., measures of worry, rumination, and obsessions incorporate the term *worry*). Third, laypersons may not interpret items in line with theorized constructs (e.g., patients often refer to past-oriented repetitive thoughts as *worry*). Last, measures of worry and rumination have often been confounded with symptoms of putatively relevant diagnoses (e.g., worry with GAD, rumination with depression). Therefore, Szkodny and Newman (2017) developed a measure of the dimensions thought to comprise and differentiate worry, rumination, and obsessions, finding evidence for factors including *lack of controllability*, *preparing for the future*, *expecting the worst*, *searching for causes/meaning*, *dwelling on the past*, and *thinking discordant with the ideal self* (i.e., ego-dystonic thoughts). Some findings diverged from theoretical formulations. For instance, both worry and rumination measures correlated with expecting the worst and dwelling on the past, suggesting that temporal distinctions are not captured by traditional measures. Thus, we suggest the clinical utility of directly assessing patients on the aforementioned six dimensions in order to differentiate the features of a patient's negative thinking. Nevertheless, the fact that traditional measures of worry and rumination correlated with all of the aforementioned factors bolsters our contention that they (albeit imperfectly) assess shared variance in RNT.

Clinical Interview

In addition to self-report questionnaires, there exist structured interviews that assess components of worry and ruminative processes (Chan, Davey, & Brewin, 2013; Francis & Dugas, 2004). Interview methods provide rich qualitative data about the content of worry and rumination. Outside of these structured procedures, clinicians are encouraged to inquire directly about content domains ("What areas do you worry about uncontrollably most often?"), beliefs about worry and rumination (e.g., "What do you see as benefits of worry?" "What might happen if you were not ruminating about this issue?" "What do you see as risks of continued worry?"). For patients whose worries or ruminations are not sufficiently concrete and specific, the classic "downward arrow" strategy provides a useful way to help patients elucidate their

core fears and concerns ("If you make mistakes as a parent, what would that mean about you or your future?"). However, the aforementioned measurement concerns apply here as well, so clinicians are encouraged to directly inquire about the six domains underlying maladaptive repetitive thinking (Szkodny & Newman, 2017). For instance, clinicians may glean a wealth of information by directly inquiring about domains such as preparing for the future ("When you get stuck in your thoughts, to what extent are you trying to ready yourself for possible future misfortune?") versus dwelling on the past ("How much do these thoughts center upon past disappointments?"). In-person clarification may often provide unambiguous information relative to traditional self-reports of worry and rumination.

CLINICAL IMPLICATIONS

Given the transdiagnostic nature of worry and rumination as mechanisms maintaining psychopathology, we now discuss ways they may apply in the context of specific transdiagnostic symptom domains, providing clinical examples for each (see Table 8.2). Because other chapters in Part II of this handbook address transdiagnostic treatment mechanisms, we do not incorporate those here.

Generalized Anxiety

Worry, of course, occurs at high levels in GAD (Startup & Erickson, 2006). No cognitive content typifies all individuals prone to general anxiety, but they may experience a broad range of worries not subsumed within more narrow domains of psychopathology (e.g., fear of evaluation in social anxiety). Such individuals may endorse uncontrollable worry related to topics from the mundane and concrete (e.g., safety, sexuality, finances), to the existential (calling and purpose) and macrolevel (e.g., geopolitical climate). Worries about interpersonal concerns are often paramount (Roemer, Molina, & Borkovec, 1997). In parallel, patients may ruminate in these domains when they perceive their own inability to reach relevant desired goals.

For instance, one middle-aged, female patient worried chronically and perseveratively not only about her self-efficacy as an accountant ("What if I can't keep up with my task list?"), but also race relations in the country ("What if people grow even more polarized, leading to another civil war?"). She reported that on one hand, staying worried conferred a sense of predictability ("It feels safer to anticipate threats than to be caught off guard.") and identity ("If I wasn't worried about my job performance, I'd be getting lazy."). Thus, worry was negatively reinforced by a sense of avoiding being surprised by unexpected difficulties at work or in the news. After a challenging work day or viral news story, her rumination seemed ego-syntonic as a way to make sense of and validate the importance of the experiences. On the other hand, worry clearly induced fear and rumination perpetuated negative moods.

TABLE 8.2. Examples of Worries and Ruminative Thoughts Across Common Symptom Types

Worry	Rumination
Generalized anxiety	
What if I lose my job and never find a new one?	*Why can't I prevent bad things when I'm in a good mood?*
What if my worrying leads to heart disease? (metaworry)	*What's wrong with people, with everyone who voted that way?*
Negative social evaluation	
How will I recover if I embarrass myself by crying?	*I wish I knew what she thinks of me after that failed date.*
What if he notices me sweating and thinks I'm incompetent?	*How come I can't ever come off like I have it together?*
Somatic concerns	
What if this bruise creates a dangerous blood clot?	*Why can't I go for long without needing medical tests?*
I wonder—could I die as a result of this fever?	*I'm doomed to these panic attacks no matter what I do.*
Trauma-related concerns	
How will I handle it if I never feel safe ever again?	*There must be something about me that attracts abusive men.*
What if someone else tries to attack me?	*Why do illegal aliens keep attacking so many people?*
Obsessive-compulsive spectrum	
What if blasphemous thoughts mean that I really hate God?	*How come I can't get those unlucky numbers out of my head?*
What if there are traces of unseen chemicals on my hands?	*Why doesn't everyone just apply hand sanitizer all winter?*
Agoraphobic concerns	
What if I get too far from my house and can't handle it?	*There must be a reason why I can't ever ride subways or trains.*
Where will I go for help if I get nauseated during the concert?	*Why does my boyfriend put up with having to drive me around?*
Phobic anxiety	
What if I encounter a dog while running?	*My brain must be broken, because I can't handle tight spaces.*
How would I be able to handle it if spiders nest in my house?	*Why did I have to move to a state with hurricanes?*
Anger	
What if she still thinks she can talk down to me?	*Why didn't that cyclist stay home and off my roads?*
What if he has no intention of ever apologizing?	*I'll bet that child meant to disobey just to spite me.*
Depression	
What if I'm forgettable to people?	*Why can't I ever feel joy in my life anymore?*
How will I get out of bed when I have no energy at all?	*I should figure out why I'm such a failure.*

Furthermore, the patient's worry and rumination, although perceived by her as a way to manage stressors, actually interfered with more adaptive coping and problem-solving. Remaining occupied with cognitive processing made it impossible to engage in self-care activities such as a relaxation or prayer (which she found aversive due to fear of being caught off guard by a threat if she "let her guard down"). Moreover, her ceaseless mental activity sapped her energy, feeding procrastination at work. Worry about race relations took the place of actually engaging in local service opportunities in her community. Interpersonally, a tendency to worry aloud and coruminate alienated her friends. She believed that she was sharing herself, but they experienced it as excessive, self-focused preoccupation and inattention to their needs.

Negative Social Evaluation

Individuals suffering from social anxiety endorse high levels of both worry (Startup & Erickson, 2006) and postevent rumination (McEvoy & Kingsep, 2006). Quintessentially, these perseverative cognitions center upon fear of social evaluation. Relevant worries feature anxious anticipation of threats to the "social self" (e.g., "What if they notice me and I start to stutter?" "What if my coworkers notice mistakes in my email messages?" "Others might hear me going to the bathroom while I'm in the stall"). Rumination and postevent processing also apply to such foci (e.g., "Why did she watch me so closely, and what does it mean that she took notes on her clipboard?" "I can't believe I blushed during my presentation. The audience probably thought I was a weakling"). Analogously, those with body dysmorphia spectrum symptoms often engage in perseverate thinking about whether others notice their imagined or real physical flaws (e.g., "What if people notice the scars on my neck?" "They probably noticed my nose; why does that bother me so much?!"). Similarly, those with body image concerns and disordered eating may worry and ruminate about others' perceptions of their bodies ("Will they notice that I gained weight?" "Why am I so fat?" "They must have thought I was lazy and weak for not maintaining my figure since high school"). In individualistic cultural contexts, perseverative cognitions often center upon interpretations of social evaluative threats toward the self, whereas in collectivistic contexts, worry and rumination may also encapsulate concerns about impact on others (e.g., "What if my poor performance brings shame on my family?" "I really hope that my body odor didn't offend other people!").

Worry and rumination may maintain distress related to social evaluation fears. A socially anxious 40-year-old man, for instance, worried incessantly about whether coworkers noticed him sweating while leading team meetings at work ("What if they notice me getting 'pitted out?' They might think I'm incompetent and too afraid to hold a leadership role"). Such worry led to excessive striving to avoid displays of sweating. He limited his own presentations in meetings, took hourly trips to the bathroom to mop his brow and

armpits, and changed his shirt whenever sweat was evident (followed by rumination about others noticing him sweating). In the short term, this excessive processing seemed to legitimate his struggles, but ultimately perpetuated his belief that sweating equals incompetence, and led him to distance himself from others. This kept him from learning a more humble, realistic perspective that no one cared if he sweated as long as he was genuine, supportive, and responsible.

Somatic Concerns

Heightened perseveration about somatic concerns occurs in, but also transcends, discrete diagnostic categories. In those with fear of somatic arousal and interoceptive cues (e.g., panic disorder, agoraphobia), worries pertain to catastrophic sequelae of unexpected somatic arousal (e.g., "What if my heart starts racing and I can't stop it?" "What if I get so anxious that I go crazy and lose my mind?"), as do ruminative episodes ("This must mean a nervous breakdown! Why am I falling apart?"). For patients with fear of illness, perseverative cognition centers instead upon imagined or real somatic symptoms as heralds of serious negative health consequences (e.g., "What if I'm dying?" "That lump could mean cancer." "I might have a rare disease that won't be caught until it's too late!"). Similarly, worry and rumination perpetuate distress in individuals with blood injection-injury phobia ("What if I see my own blood when getting work done at the dentist, and then pass out?" "I bet my fear of needles goes back to all those cavities I had filled as a child"). Some body dysmorphia concerns cannot be explained fully by social evaluation fears (e.g., "Something is really wrong with my skin. Why do I still have acne as an adult? What if it never goes away?") as with other body image concerns ("What if I'm destined for obesity? My family history probably means that").

For illustrative purposes, consider the case of a woman who presented with panic disorder (involving fear of interoceptive cues of somatic arousal), agoraphobia, and illness anxiety. She endorsed chronic worry about not only future uncued panic attacks in which she might experience somatic activation (namely, heart palpitations, shakiness, and sensations of "smothering"), but also fear of a variety of maladies including heart attacks and multiple sclerosis. Worries served to keep her vigilant for signs of unexplained somatic activation or symptoms such as headaches, minor epidermal spots, and concentration difficulties. These worries promoted behavioral changes including reduced sexual intimacy with her partner, avoidance of places where escape would be difficult (e.g., sitting near the exit at cinemas and cafés), and repeated medical "checking" (reviewing symptom lists on medical Internet sites, excessive reassurance seeking from physicians). Moreover, worry led to requiring her boyfriend to accompany her while driving. Despite his initial willingness to provide comfort, excessive reliance upon him contributed to his increasing annoyance with her. In turn, the patient ruminated about the meaning of her anxiety and worried about the future of the relationship.

Trauma-Related Concerns

Research on trauma survivors reveals proneness to both perseverative "what if?" (i.e., worry) and "why?" thoughts (rumination); such thoughts represent both ways of responding to intrusive trauma memories and also further activate them (Michael, Halligan, Clark, & Ehlers, 2007). Individuals with persistent posttraumatic symptoms may worry about the risk of future threats ("What if I am the victim of another assault?"), the frequency and meaning of reexperiencing symptoms ("What if I can't stop thinking about the attack?" "What if I can never drive a car again without feeling agitated?"), and hyperarousal symptoms themselves ("Will I never be able to sleep well again?"). Similarly, they may engage in self-focused ruminative cognition about the self—including whether the self is vulnerable, fragile, and to blame for the trauma—as well as about others and the world ("This means that no one can be trusted." "Why is the world so dangerous?").

A man who survived a traumatic motor vehicle accident in which he was dragged under a car worried both about not being able to drive again and possibly suffering another accident when he did drive. He also worried that the physical injuries and recovery period would lead to lost work productivity. When this feared outcome occurred, he ruminated about why he had allowed injury to impact his success at work. Worry maintained his anxiety and hypervigilance, focusing his attention on overestimated odds of future accidents. Rumination contributed to dysphoric mood and anhedonia both directly and by taking the place of more active problem-solving. He searched online excessively about legal and physical aspects of car accidents, but he would quickly become overwhelmed and resort to aimless web surfing and self-isolation rather than practicing physical therapy activities and seeking social support, illustrating how worry and rumination perpetuated his problems associated with aftereffects of trauma.

Obsessive-Compulsive Spectrum

Measures of obsessions, worries, and rumination correlate positively (Exner, Martin, & Rief, 2009), and obsessions and worries bear similarities in their perseverative nature, negative valence, and temporal focus on potential future threats. However, obsessional thoughts may be somewhat more ego-dystonic and intrusive (Langlois et al., 2000; Szkodny & Newman, 2017), and typically occur in the context of OCD. Worries and rumination may pertain to content domains typical of OCD. For instance, individuals preoccupied with contamination may not only experience obsessional intrusive thoughts that they have been sullied by contact with germs, but may also worry about the possible consequences of contact ("What if those germs make me violently ill?") and ruminate about the ubiquity of microbes and disease. Similarly, one may worry and ruminate about lack of symmetry ("What if my books get out of order?" "I will never convince my spouse to put them back the right way") or superstitions ("What if the number 6 occurs in my paycheck?" "Why is it so hard not to step on cracks, pleasing the devil?").

For patients with "pure" obsessions (i.e., typically intrusive sexual, aggressive, or blasphemous thoughts), worries (including metaworries) often center on potential threatening meanings of the fact that one experiences intrusive thoughts. For instance, those with intrusive thoughts about violating their own sexual standards may worry that their deepest fear is true (e.g., "What if—deep down—I really do *want* to molest children?"), or even that allowing themselves to encounter related stimuli or thoughts might prove their fears true. Those plagued by fears of aggression or blasphemy similar worry in these domains ("What if my true self is violent and could appear at any time?" "What if I *actually* hate God even though I say I don't?"). Those preoccupied with moral scrupulosity can find themselves perseverating on whether they can avoid perceived sins. Rumination about the inability to gain complete certainty about these issues can also generate further distress and dysphoria (e.g., "Why can't I settle for certain whether my spouse truly loves me?" "Maybe I really am a monster after all"). Worry and rumination in these contexts serve a function of mental striving to gain predictability or certainty, although they ultimately perpetuate distress and undercut acceptance and action.

CONCLUSION

Worry and rumination are perseverative negative forms of thinking that maintain psychopathology by promoting distress, creating negative states to avoid other perceived threats, and disrupting problem-solving and interpersonal functioning. We encourage clinicians to assess worry and rumination before, during, and after interventions for not only general anxiety and depression, but the full spectrum of symptom dimensions. Transdiagnostic mechanisms of change such as cognitive restructuring, exposure (facilitating extinction and habituation), mindfulness interventions, and lifestyle changes serve as front-line interventions to target worry and/or rumination. Future research must confirm unique features (e.g., relative focus on future threats versus past failures) and functions (preventing unexpected mood shifts versus seeking certainty or meaning in failures), as well as the differential effectiveness of interventions depending on patients' type of RNT. In the meantime, however, clinicians can confidently take advantage of the strong evidence for the importance of identifying and treating worry and rumination in the service of improving the lives of our patients.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association.
Arditte, K., Shaw, A., & Timpano, K. (2016). Repetitive negative thinking: A transdiagnostic correlate of affective disorders. *Journal of Social and Clinical Psychology, 35*, 181–201. http://dx.doi.org/10.1521/jscp.2016.35.3.181
Berle, D., Starcevic, V., Moses, K., Hannan, A., Milicevic, D., & Sammut, P. (2011). Preliminary validation of an ultra-brief version of the Penn State Worry Questionnaire. *Clinical Psychology & Psychotherapy, 18*, 339–346. http://dx.doi.org/10.1002/cpp.724
Borkovec, T. D., Alcaine, O. M., & Behar, E. (2004). Avoidance theory of worry and generalized anxiety disorder. In R. G. Heimberg, C. L. Turk, D. S. Mennin,

R. G. Heimberg, C. L. Turk, & D. S. Mennin (Eds.), *Generalized anxiety disorder: Advances in research and practice* (pp. 77–108). New York, NY: Guilford Press.

Borkovec, T. D., Robinson, E., Pruzinsky, T., & DePree, J. A. (1983). Preliminary exploration of worry: Some characteristics and processes. *Behaviour Research and Therapy*, *21*, 9–16. http://dx.doi.org/10.1016/0005-7967(83)90121-3

Cartwright-Hatton, S., & Wells, A. (1997). Beliefs about worry and intrusions: The Meta-Cognitions Questionnaire and its correlates. *Journal of Anxiety Disorders, 11*, 279–296. http://dx.doi.org/10.1016/S0887-6185(97)00011-X

Chan, J. C., Davey, G. C., & Brewin, C. R. (2013). Understanding depressive rumination from a mood-as-input perspective: Effects of stop-rule manipulation. *Behaviour Research and Therapy*, *51*, 300–306. http://dx.doi.org/10.1016/j.brat.2013.02.007

Chorpita, B. F., Tracey, S. A., Brown, T. A., Collica, T. J., & Barlow, D. H. (1997). Assessment of worry in children and adolescents: An adaptation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy*, *35*, 569–581. http://dx.doi.org/10.1016/S0005-7967(96)00116-7

Conway, M., Csank, P. A., Holm, S. L., & Blake, C. K. (2000). On assessing individual differences in rumination on sadness. *Journal of Personality Assessment*, *75*, 404–425. http://dx.doi.org/10.1207/S15327752JPA7503_04

Crouch, T. A., Lewis, J. A., Erickson, T. M., & Newman, M. G. (2017). Prospective investigation of the contrast avoidance model of generalized anxiety and worry. *Behavior Therapy*, *48*, 544–556. http://dx.doi.org/10.1016/j.beth.2016.10.001

Dugas, M. J., Letarte, H., Rhéaume, J., Freeston, M. H., & Ladouceur, R. (1995). Worry and problem solving: Evidence of a specific relationship. *Cognitive Therapy and Research*, *19*, 109–120. http://dx.doi.org/10.1007/BF02229679

Ehring, T., & Watkins, E. R. (2008). Repetitive negative thinking as a transdiagnostic process. *International Journal of Cognitive Therapy*, *1*, 192–205. http://dx.doi.org/10.1521/ijct.2008.1.3.192

Ehring, T., Zetsche, U., Weidacker, K., Wahl, K., Schönfeld, S., & Ehlers, A. (2011). The Perseverative Thinking Questionnaire (PTQ): Validation of a content-independent measure of repetitive negative thinking. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*, 225–232. http://dx.doi.org/10.1016/j.jbtep.2010.12.003

Erickson, T. M., Granillo, M. T., Crocker, J., Abelson, J. L., Reas, H. E., & Quach, C. M. (2018). Compassionate and self-image goals as interpersonal maintenance factors in clinical depression and anxiety. *Journal of Clinical Psychology, 74,* 608–625. http://dx.doi.org/10.1002/jclp.22524

Erickson, T. M., & Newman, M. G. (2007). Interpersonal and emotional processes in generalized anxiety disorder analogues during social interaction tasks. *Behavior Therapy*, *38*, 364–377. http://dx.doi.org/10.1016/j.beth.2006.10.005

Erickson, T. M., Newman, M. G., Siebert, E. C., Carlile, J. A., Scarsella, G. M., & Abelson, J. L. (2016). Does worrying mean caring too much? Interpersonal prototypicality of dimensional worry controlling for social anxiety and depressive symptoms. *Behavior Therapy*, *47*, 14–28. http://dx.doi.org/10.1016/j.beth.2015.08.003

Exner, C., Martin, V., & Rief, W. (2009). Self-focused ruminations and memory deficits in obsessive–compulsive disorder. *Cognitive Therapy and Research*, *33*, 163–174. http://dx.doi.org/10.1007/s10608-007-9162-x

Francis, K., & Dugas, M. J. (2004). Assessing positive beliefs about worry: Validation of a structured interview. *Personality and Individual Differences*, *37*, 405–415. http://dx.doi.org/10.1016/j.paid.2003.09.012

Fresco, D. M., Frankel, A. N., Mennin, D. S., Turk, C. L., & Heimberg, R. G. (2002). Distinct and overlapping features of rumination and worry: The relationship of cognitive production to negative affective states. *Cognitive Therapy and Research*, *26*, 179–188. http://dx.doi.org/10.1023/A:1014517718949

Gladstone, G. L., Parker, G. B., Mitchell, P. B., Malhi, G. S., Wilhelm, K. A., & Austin, M. P. (2005). A Brief Measure of Worry Severity (BMWS): Personality and clinical cor-

relates of severe worriers. *Journal of Anxiety Disorders*, *19*, 877–892. http://dx.doi.org/10.1016/j.janxdis.2004.11.003

Hebert, E. A., Dugas, M. J., Tulloch, T. G., & Holowka, D. W. (2014). Positive beliefs about worry: A psychometric evaluation of the Why Worry-II. *Personality and Individual Differences*, *56*, 3–8. http://dx.doi.org/10.1016/j.paid.2013.08.009

Hopko, D. R., Reas, D. L., Beck, J. G., Stanley, M. A., Wetherell, J. L., Loebach, J., . . . Averill, P. M. (2003). Assessing worry in older adults: Confirmatory factor analysis of the Penn State Worry Questionnaire and psychometric properties of an abbreviated model. *Psychological Assessment*, *15*, 173–183. http://dx.doi.org/10.1037/1040-3590.15.2.173

Joormann, J. (2006). Differential effects of rumination and dysphoria on the inhibition of irrelevant emotional material: Evidence from a negative priming task. *Cognitive Therapy and Research*, *30*, 149–160. http://dx.doi.org/10.1007/s10608-006-9035-8

Koerner, N., & Dugas, M. J. (2006). A cognitive model of generalized anxiety disorder: The role of intolerance of uncertainty. In G. L. Davey, & A. Wells (Eds.), *Worry and its psychological disorders: Theory, assessment and treatment* (pp. 201–216). Hoboken, NJ: Wiley. http://dx.doi.org/10.1002/9780470713143.ch12

Langlois, F., Freeston, M. H., & Ladouceur, R. (2000). Differences and similarities between obsessive intrusive thoughts and worry in a non-clinical population: Study 1. *Behaviour Research and Therapy*, *38*, 157–173. http://dx.doi.org/10.1016/S0005-7967(99)00027-3

Llera, S. J., & Newman, M. G. (2010). Effects of worry on physiological and subjective reactivity to emotional stimuli in generalized anxiety disorder and nonanxious control participants. *Emotion*, *10*, 640–650. http://dx.doi.org/10.1037/a0019351

Llera, S. J., & Newman, M. G. (2014). Rethinking the role of worry in generalized anxiety disorder: Evidence supporting a model of emotional contrast avoidance. *Behavior Therapy*, *45*, 283–299. http://dx.doi.org/10.1016/j.beth.2013.12.011

Llera, S. J., & Newman, M. G. (2017). Development and validation of two measures of emotional contrast avoidance: The contrast avoidance questionnaires. *Journal of Anxiety Disorders*, *49*, 114–127. http://dx.doi.org/10.1016/j.janxdis.2017.04.008

Lyubomirsky, S., Kasri, F., Chang, O., & Chung, I. (2006). Ruminative response styles and delay of seeking diagnosis for breast cancer symptoms. *Journal of Social and Clinical Psychology*, *25*, 276–304. http://dx.doi.org/10.1521/jscp.2006.25.3.276

Lyubomirsky, S., Tucker, K. L., Caldwell, N. D., & Berg, K. (1999). Why ruminators are poor problem solvers: Clues from the phenomenology of dysphoric rumination. *Journal of Personality and Social Psychology*, *77*, 1041–1060. http://dx.doi.org/10.1037/0022-3514.77.5.1041

McEvoy, P. M., & Kingsep, P. (2006). The post-event processing questionnaire in a clinical sample with social phobia. *Behaviour Research and Therapy*, *44*, 1689–1697. http://dx.doi.org/10.1016/j.brat.2005.12.005

McEvoy, P. M., Mahoney, A. E., & Moulds, M. L. (2010). Are worry, rumination, and post-event processing one and the same? Development of the repetitive thinking questionnaire. *Journal of Anxiety Disorders*, *24*, 509–519. http://dx.doi.org/10.1016/j.janxdis.2010.03.008

McLaughlin, K. A., Borkovec, T. D., & Sibrava, N. J. (2007). The effects of worry and rumination on affect states and cognitive activity. *Behavior Therapy*, *38*, 23–38. http://dx.doi.org/10.1016/j.beth.2006.03.003

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy*, *28*, 487–495. http://dx.doi.org/10.1016/0005-7967(90)90135-6

Michael, T., Halligan, S. L., Clark, D. M., & Ehlers, A. (2007). Rumination in post-traumatic stress disorder. *Depression and Anxiety*, *24*, 307–317. http://dx.doi.org/10.1002/da.20228

Newman, M. G., & Erickson, T. M. (2010). Generalized anxiety disorder. In J. G. Beck (Ed.), *Interpersonal processes in the anxiety disorders: Implications for understanding psychopathology and treatment* (pp. 235–259). Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/12084-009

Newman, M. G., & Llera, S. J. (2011). A novel theory of experiential avoidance in generalized anxiety disorder: A review and synthesis of research supporting a contrast avoidance model of worry. *Clinical Psychology Review*, *31*, 371–382. http://dx.doi.org/10.1016/j.cpr.2011.01.008

Newman, M. G., Llera, S. J., Erickson, T. M., Przeworski, A., & Castonguay, L. G. (2013). Worry and generalized anxiety disorder: A review and theoretical synthesis of evidence on nature, etiology, mechanisms, and treatment. *Annual Review of Clinical Psychology*, *9*, 275–297. http://dx.doi.org/10.1146/annurev-clinpsy-050212-185544

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, *100*, 569–582. http://dx.doi.org/10.1037/0021-843X.100.4.569

Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology*, *109*, 504–511. http://dx.doi.org/10.1037/0021-843X.109.3.504

Nolen-Hoeksema, S., & Davis, C. G. (1999). "Thanks for sharing that": Ruminators and their social support networks. *Journal of Personality and Social Psychology*, *77*, 801–814. http://dx.doi.org/10.1037/0022-3514.77.4.801

Nolen-Hoeksema, S., & Jackson, B. (2001). Mediators of the gender difference in rumination. *Psychology of Women Quarterly*, *25*, 37–47. http://dx.doi.org/10.1111/1471-6402.00005

Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta Earthquake. *Journal of Personality and Social Psychology*, *61*, 115–121. http://dx.doi.org/10.1037/0022-3514.61.1.115

Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion*, *7*, 561–570. http://dx.doi.org/10.1080/02699939308409206

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science*, *3*, 400–424. http://dx.doi.org/10.1111/j.1745-6924.2008.00088.x

Papageorgiou, C., & Wells, A. (2001). Positive beliefs about depressive rumination: Development and preliminary validation of a self-report scale. *Behavior Therapy*, *32*, 13–26. http://dx.doi.org/10.1016/S0005-7894(01)80041-1

Pieper, S., Brosschot, J. F., van der Leeden, R., & Thayer, J. F. (2010). Prolonged cardiac effects of momentary assessed stressful events and worry episodes. *Psychosomatic Medicine*, *72*, 570–577. http://dx.doi.org/10.1097/PSY.0b013e3181dbc0e9

Ray, R. D., Ochsner, K. N., Cooper, J. C., Robertson, E. R., Gabrieli, J. D., & Gross, J. J. (2005). Individual differences in trait rumination and the neural systems supporting cognitive reappraisal. *Cognitive, Affective & Behavioral Neuroscience*, *5*, 156–168. http://dx.doi.org/10.3758/CABN.5.2.156

Roemer, L., Molina, S., & Borkovec, T. D. (1997). An investigation of worry content among generally anxious individuals. *Journal of Nervous and Mental Disease*, *185*, 314–319. http://dx.doi.org/10.1097/00005053-199705000-00005

Ruscio, A. M., Borkovec, T. D., & Ruscio, J. (2001). A taxometric investigation of the latent structure of worry. *Journal of Abnormal Psychology*, *110*, 413–422. http://dx.doi.org/10.1037/0021-843X.110.3.413

Segerstrom, S. C., Stanton, A. L., Flynn, S. M., Roach, A. R., Testa, J. J., & Hardy, J. K. (2012). Episodic repetitive thought: Dimensions, correlates, and consequences. *Anxiety, Stress, and Coping*, *25*, 3–21. http://dx.doi.org/10.1080/10615806.2011.608126

Speckens, A. E., Hackmann, A., Ehlers, A., & Cuthbert, B. (2007). Imagery special issue: Intrusive images and memories of earlier adverse events in patients with obsessive compulsive disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*, 411–422. http://dx.doi.org/10.1016/j.jbtep.2007.09.004

Startup, H. M., & Erickson, T. M. (2006). The Penn State Worry Questionnaire (PSWQ). In G. L. Davey & A. Wells (Eds.), *Worry and its psychological disorders: Theory, assessment and treatment* (pp. 101–119). Hoboken, NJ: Wiley. http://dx.doi.org/10.1002/9780470713143.ch7

Stone, L. B., Hankin, B. L., Gibb, B. E., & Abela, J. R. (2011). Co-rumination predicts the onset of depressive disorders during adolescence. *Journal of Abnormal Psychology*, *120*, 752–757. http://dx.doi.org/10.1037/a0023384

Sukhodolsky, D. G., Golub, A., & Cromwell, E. N. (2001). Development and validation of the anger rumination scale. *Personality and Individual Differences*, *31*, 689–700. http://dx.doi.org/10.1016/S0191-8869(00)00171-9

Swann, W. B., & Read, S. J. (1981). Acquiring self-knowledge: The search for feedback that fits. *Journal of Personality and Social Psychology*, *41*, 1119–1128. http://dx.doi.org/10.1037/0022-3514.41.6.1119

Szkodny, L., & Newman, M. (2017). Delineating characteristics of maladaptive repetitive thought: Development and preliminary validation of the Perseverative Cognitions Questionnaire. *Assessment*. Advance online publication. http://dx.doi.org/10.1177/1073191117698753

Tallis, F., Davey, G. L., & Bond, A. (1994). The Worry Domains Questionnaire. In G. L. Davey & F. Tallis (Eds.), *Worrying: Perspectives on theory, assessment and treatment* (pp. 285–297). Oxford, England: John Wiley & Sons.

Trapnell, P. D., & Campbell, J. D. (1999). Private self-consciousness and the five-factor model of personality: Distinguishing rumination from reflection. *Journal of Personality and Social Psychology, 76*, 284–304. http://dx.doi.org/10.1037/0022-3514.76.2.284

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, *27*, 247–259. http://dx.doi.org/10.1023/A:1023910315561

Watkins, E., & Baracaia, S. (2002). Rumination and social problem-solving in depression. *Behaviour Research and Therapy*, *40*, 1179–1189. http://dx.doi.org/10.1016/S0005-7967(01)00098-5

Wells, A. (2006). The anxious thoughts inventory and related measures of metacognition and worry. In G. L. Davey & A. Wells (Eds.), *Worry and its psychological disorders: Theory, assessment and treatment* (pp. 121–136). Hoboken, NJ: Wiley. http://dx.doi.org/10.1002/9780470713143.ch8

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: Properties of the MCQ-30. *Behaviour Research and Therapy*, *42*, 385–396. http://dx.doi.org/10.1016/S0005-7967(03)00147-5

Yang, M.-J., Kim, B.-N., Lee, E.-H., Lee, D., Yu, B.-H., Jeon, H. J., & Kim, J.-H. (2014). Diagnostic utility of worry and rumination: A comparison between generalized anxiety disorder and major depressive disorder. *Psychiatry and Clinical Neurosciences*, *68*, 712–720. http://dx.doi.org/10.1111/pcn.12193

9

Perfectionism

Ariella P. Lenton-Brym and Martin M. Antony

Agnes started a competitive master's degree program and was struggling to adjust to its demands. Last year, she aimed to not only earn top grades but also publish several manuscripts, conduct an independent research study, and take on a student mentoring position. Agnes felt that it was absolutely necessary to achieve these goals; however, each time she met one, she discounted its importance and "raised the bar" for success. For example, after publishing a manuscript, Agnes felt that she took too long to complete it and worried that she should be producing more articles and publishing them in more prestigious journals. Despite her academic success, Agnes also worried about class performance. After giving presentations, she ruminated and harshly criticized herself for minor mistakes, telling herself that she ruined the presentation because she stumbled over a few words. She also worried about her supervisor's expectations, believing that he expected her work to be perfect. As a result, she felt overwhelmed about her master's thesis and repeatedly delayed working on it. She started to fall behind schedule and felt like a failure.[1]

Many people set high standards for their own performance—doing so may help them to maintain goal-focused attention and provide motivation when obstacles to their success arise. However, as seen in the case of Agnes, issues begin when people (a) set standards that are impossibly high, (b) rigidly pursue those standards even when they cause harm to the self, and (c) feel dissatisfied even after the standards are seemingly met. Together, these tendencies reflect what is sometimes referred to as *clinical perfectionism*, although

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[1]All clinical case material has been altered to protect patient confidentiality.

there is disagreement in the literature about how best to define this construct. This section provides a brief overview of extant definitions.

Unidimensional Versus Multidimensional Definitions

Early definitions reflect a unidimensional understanding of perfectionism. Burns (1980) defined perfectionism as the tendency to hold unrealistically high standards, strive toward them unremittingly, and estimate one's worth based solely on achievement. In the 1990s, however, researchers recognized that (a) individuals with perfectionism expressed concerns spanning various domains, and (b) interpersonal features of perfectionism were not being captured by unidimensional definitions (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991). Frost et al. (1990) proposed six dimensions of perfectionism: personal standards, organization, concern over mistakes, doubts about actions, parental expectations, and parental criticism. Hewitt and Flett (1991) proposed three dimensions: self-oriented perfectionism (i.e., setting high standards for oneself), other-oriented perfectionism (i.e., holding others to perfectionistic standards), and socially prescribed perfectionism (i.e., believing that others have unrealistic standards for us). Research supporting the multi-dimensional approach has shown that different dimensions relate differentially to various forms of psychopathology and maladaptive personality traits. Not all studies, however, support the multidimensional view, and some research groups have argued that certain dimensions of perfectionism reflect correlates of the construct rather than features of perfectionism itself (e.g., Shafran, Cooper, & Fairburn, 2002; Stöber, 1998).

Adaptive Versus Maladaptive Perfectionism

Factor analytic research suggests a distinction between adaptive and maladaptive perfectionism (Bieling, Israeli, & Antony, 2004; Cox, Enns, & Clara, 2002; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). Despite some variation in terminology and specific study findings, *adaptive perfectionism* is consistently thought to include self-oriented perfectionism and positive striving, whereas *maladaptive perfectionism* consistently comprises concern over mistakes, doubts about actions, and socially prescribed perfectionism (Dunkley, Blankstein, Masheb, & Grilo, 2006). Of these two forms of perfectionism, the maladaptive type is more strongly related to anxiety and depression (e.g., Dunkley et al., 2006; Stoeber & Otto, 2006). Adaptive perfectionism, in contrast, is either unrelated or inversely related to psychological distress (Antony, Purdon, Huta, & Swinson, 1998; Chang, Watkins, & Banks, 2004; Enns & Cox, 1999) and is associated with positive outcomes including feelings of pride, self-compassion, and optimism (Fedewa, Burns, & Gomez, 2005; Lizmore, Dunn, & Causgrove Dunn, 2017), problem-focused coping (Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000), reduced self-defeating behavior

(Bieling, Israeli, Smith, & Antony, 2003), and greater task-focused attention (Rhéaume et al., 2000).

Some have criticized this dichotomous model of perfectionism on the grounds that it (a) equates adaptive perfectionism with conscientiousness and (b) overstates the adaptiveness of perfectionism (Flett & Hewitt, 2006). Indeed, some components of adaptive perfectionism are associated with low self-satisfaction (e.g., Enns, Cox, Sareen, & Freeman, 2001; Mor, Day, Flett, & Hewitt, 1995), eating disorders (e.g., Castro-Fornieles et al., 2007), self-punitiveness, depression (Hull, Lehn, & Tedlie, 1991), and suicidality (Smith et al., 2018). Thus, Gaudreau and Thompson (2010) proposed that personal striving (adaptive) and evaluative concerns (maladaptive) reflect coexisting dimensions of perfectionism, rather than opposite sides of the same coin. Research on this model suggests that elevated tendencies toward both dimensions are more adaptive than elevated evaluative concerns alone.

Cognitive Behavior Definition of Perfectionism

Shafran et al. (2002) proposed an alternative to the multidimensional approach previously described. These authors emphasized the setting of high standards and the belief that one's self-worth is contingent on attainment of such standards. Standards need only be demanding for the individual (i.e., not necessarily objectively demanding), and perfectionism may be restricted to specific domains of life that hold personal relevance for the individual. In this model, the core psychopathology of perfectionism is thought to catalyze various maladaptive processes, including adopting all-or-nothing indications of success (e.g., "If I mispronounce one word, I have failed"), exercising stringent self-control, and critically evaluating one's own performance in a biased manner (i.e., by assigning more weight to indications of failure than to indications of success). This conceptualization reflects a trade-off in the difficult task of defining perfectionism: by providing a streamlined definition, Shafran et al. did not capture the maladaptive standards that perfectionistic individuals may hold for others, which may be important information to garner in a clinical setting where such standards may give rise to interpersonal problems.

Perfectionism as a Transdiagnostic Process

Evidence also supports the conceptualization of perfectionism as a transdiagnostic process; perfectionism serves as a risk factor or maintaining mechanism of various psychological disorders, and therapeutic interventions aimed at reducing perfectionism have been shown to reduce psychopathology across these disorders (see Egan, Wade, & Shafran, 2011, for a review). The transdiagnostic approach is also thought to help explain the comorbidity of psychological disorders by recognizing the existence of shared maintaining mechanisms, such as perfectionism, that are common among them (Harvey, Watkins, Mansell, & Shafran, 2004).

Perfectionism in Obsessive-Compulsive Personality Disorder

Perfectionism is a core feature of obsessive-compulsive personality disorder (OCPD), although in this context perfectionism differs from that described thus far. Individuals with OCPD tend to be preoccupied with details, rules, and organization, often to the extent that it interferes with task completion (American Psychiatric Association, 2013). Perfectionism in this context allows individuals with OCPD to gain a sense of control, which as discussed later is also an important process in understanding perfectionism in obsessive-compulsive disorder (OCD).

CONCEPTUAL IMPLICATIONS

Perfectionism, in its various forms, is associated with correlates of anxious psychopathology, such as stress, avoidant coping, and social factors (Burgess & DiBartolo, 2016; Dunkley et al., 2000). Moreover, perfectionistic beliefs appear to play a role in generating anxiety. In this section, we provide an overview of how anxious psychopathology is maintained by problem perfectionism.

Stress

Cognitive approaches to understanding psychological stress (e.g., Lazarus & Folkman, 1984) purport that when people are confronted with stressors, they make appraisals about whether those stressors are relevant or threatening to their well-being, and simultaneously evaluate their ability to cope (Dunkley et al., 2000). In turn, these appraisals dictate the extent to which stressors negatively influence the individual. Individuals high in maladaptive perfectionism tend to interpret challenging situations as having high stakes for their personal well-being, as even minor mistakes are taken as indications of personal failure (Burgess & DiBartolo, 2016). Consequently, individuals with elevated perfectionism may have a low threshold for perceiving life events as highly stressful. Returning to the case of Agnes, while class presentations are nerve-wracking for many students, Agnes experienced more intense stress in anticipation of her presentation precisely because it was a particularly high stakes scenario; her self-evaluation was contingent on its success.

Ample research has supported the mediating role of stress in the relationship between maladaptive perfectionism and various indicators of psychological maladjustment, including increased suicide ideation, negative affect, and depressive symptoms, as well as reduced positive affect and life satisfaction (Ashby, Noble, & Gnilka, 2012; Chang et al., 2004). With respect to anxiety in particular, Dunkley et al. (2000) found that the frequency and duration with which participants experienced daily stressors ("hassles") mediated the relationship between maladaptive perfectionism and anxious (as well as depressive) symptoms.

Coping

When faced with challenges, individuals with maladaptive perfectionism tend to display a "helplessness orientation," exhibiting a tendency to give up or avoid the situation and feel inadequate as a result (Flett, Russo, & Hewitt, 1994). Specifically, socially prescribed perfectionism is associated with increased reliance on maladaptive emotion-focused coping (Hewitt, Flett, & Endler, 1995), lower ratings of problem-solving self-efficacy, reduced use of constructive coping techniques, and greater use of negative coping techniques (Flett et al., 1994). Maladaptive perfectionism is also associated with the tendency to procrastinate, which may be seen as a form of avoidant coping through which one evades imperfect performance or potential failure (Frost et al., 1990).

Several studies have found that avoidant coping mediates the relationship between maladaptive perfectionism and anxiety (e.g., Weiner & Carton, 2012). Avoidant coping, involving denial and behavioral disengagement, has been shown to exacerbate anxiety both directly and indirectly by increasing stress (Dunkley et al., 2000). The case of Agnes demonstrates how this process plays out: Each time she tried to work on her thesis, Agnes quickly felt overwhelmed and began thinking that she was not smart enough to produce a result that would meet her supervisor's standards. Instead of devoting energy to the task at hand, Agnes felt stressed and shut down her computer. Later, she felt anxious that she was falling behind schedule, and told herself that she was a failure.

Perception of Reduced Social Support and Social Feedback

Interpersonal models of psychopathology suggest that the presence of social support positively influences psychological well-being, whereas the absence of social support has deleterious psychological consequences. Social support may improve well-being by offering positive experiences in people's lives, as well as by bolstering the perception that one is able to cope when faced with stress. Despite some inconsistent findings (e.g., Zhou, Zhu, Zhang, & Cai, 2013), several studies have shown that maladaptive perfectionism is associated with the tendency to feel lonely and believe that one has reduced social support. The reasons for this are not entirely clear. One suggestion is that individuals with elevated perfectionism are so focused on achieving high standards that they have difficulty maintaining interpersonal relationships (Chang, Sanna, Chang, & Bodem, 2008). No studies, however, have found an association between self-oriented perfectionism (which involves setting high standards) and perceived social support. Alternatively, some individuals may have unreasonably high standards for their peers (i.e., other-oriented perfectionism), and as a result feel perpetually dissatisfied with the level of support provided by interpersonal relationships. Regardless of the mechanism by which perfectionism gives rise to the perception of reduced social support, feelings of loneliness and the belief that one will not have sufficient support

in times of stress have been shown to perpetuate symptoms of anxiety, depression, and psychosocial impairment (Dunkley et al., 2000; Chang et al., 2008; Sherry, Law, Hewitt, Flett, & Besser, 2008).

In addition to the perception of reduced social support, receiving negative social feedback is also associated with increased symptoms of anxiety and depression. Importantly, socially prescribed perfectionism is associated with more frequent negative social interactions (Flett, Hewitt, Garshowitz, & Martin, 1997), and studies have shown that negative social feedback and interpersonal rumination (i.e., the extent to which people reflect on perceived social transgressions) mediate the relationship between socially prescribed perfectionism and social anxiety (Nepon, Flett, Hewitt, & Molnar, 2011).

Cognitive Factors

Maladaptive perfectionism is associated with cognitive factors that give rise to and maintain anxiety. For example, when feeling down, individuals with elevated socially prescribed and self-oriented perfectionism tend to (a) adopt a ruminative response style characterized by focusing on one's own sadness, (b) criticize oneself, and (c) compare one's situation to an unachieved standard (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). This response style in turn contributes to and maintains generalized anxiety, anxious arousal, depression, and feelings of hopelessness (O'Connor, O'Connor, & Marshall, 2007). Research has also shown that core beliefs that reflect perfectionistic striving (e.g., "My work should be flawless") are highly susceptible to negative, self-relevant automatic thoughts (e.g., "I'm a failure"), and that the experience of these negative automatic thoughts contributes to symptoms of anxiety and depression (Pirbaglou et al., 2013). In Agnes's case, as she considered her desire to produce a perfect master's thesis, her thoughts quickly became negative. She worried she would let down her supervisor and that her peers would produce better work than she could, which led to feelings of anxiety and sadness.

ASSESSMENT

Clinical Interviews

Guidelines for Interviewing

Egan, Wade, Shafran, and Antony (2014) provided an overview of core areas to assess during a clinical interview, including the triggers for an individual's perfectionistic thoughts, behavioral and cognitive features as described earlier (e.g., rigidly held demands on oneself and others, extreme standards), physiological responses, environmental factors that contribute to one's perfectionistic tendencies, and domains of perfectionism (e.g., work, relationships). They also recommend assessing the impact of perfectionism (e.g., distress, impairment), and the development and course of the problem.

Clinical Perfectionism Examination

The Clinical Perfectionism Examination (Riley, Lee, Cooper, Fairburn, & Shafran, 2007) is a 12-item semistructured interview designed to assess clinical perfectionism severity. Initial findings suggest good test–retest reliability, interrater reliability, and internal consistency. It has also demonstrated adequate convergent validity, correlating moderately with self-report scales described below.

Self-Report Measures

Clinicians may choose from numerous self-report tools that have been designed to assess perfectionism and related constructs (for a review, see Egan et al., 2014). This section describes two commonly used multidimensional perfectionism scales, as well as an additional measure that may be particularly useful for measuring perfectionism in clinical settings.

Multidimensional Perfectionism Scale

The Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990) is a 35-item scale that is widely used to measure perfectionism along six dimensions: concern over mistakes (e.g., "I should be upset if I make a mistake"), doubts about actions (e.g., "Even when I do something very carefully, I often feel that it is not quite right"), personal standards (e.g., "I have extremely high goals"), parental expectations (e.g., "My parents have expected excellence from me"), parental criticism (e.g., "As a child, I was punished for doing things less than perfectly"), and organization ("Neatness is very important to me"). Items are scored on a 5-point Likert scale, allowing the calculation of subtotals for each dimension as well as a total for the whole scale (excluding organization, which correlates weakly with the other dimensions). However, because the subscales seem to measure different constructs, the total score for all subscales is unlikely to be meaningful. The FMPS subscales have generally demonstrated good-to-excellent reliability and good concurrent validity, correlating with other measures of perfectionism (Frost et al., 1990). A limitation is that the FMPS was developed on an all-female sample of undergraduate students, and follow-up studies on more diverse samples have questioned the original factorial structure (e.g., Cox et al., 2002; Purdon, Antony, & Swinson, 1999; Stöber, 1998).

Hewitt and Flett Multidimensional Perfectionism Scale

The Hewitt and Flett Multidimensional Perfectionism Scale (HMPS; Hewitt & Flett, 1991) consists of 45 items measuring three subscales: (a) self-oriented perfectionism, (b) other-oriented perfectionism, and (c) socially prescribed perfectionism. The three trait dimensions have adequate to good internal consistency and temporal stability. Established associations between the HMPS subscales and clinician ratings, as well as correlations between the subscales and theoretically similar constructs, provide evidence of concurrent

validity (Hewitt & Flett, 1991; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991). Two shorter, 15-item versions of the HMPS have also demonstrated similar psychometric characteristics (Cox et al., 2002; Hewitt, Habke, Lee-Baggley, Sherry, & Flett, 2008).

Clinical Perfectionism Questionnaire

The Clinical Perfectionism Questionnaire (CPQ) was designed to measure the unidimensional construct of clinical perfectionism proposed in Shafran et al.'s (2002) cognitive behavior model. Its 12 items assess cognitive, behavioral, and affective components of goals striving and the consequences of failure to meet one's goals (Riley et al., 2007), and there is one open-ended question in which participants describe the domains of life in which they set high standards. The CPQ is particularly applicable to clinical settings because it asks about patients' experiences only over the past month, so it can be used to assess change over the course of treatment. Despite its intention to measure a unidimensional construct, studies suggest that the CPQ has two factors, capturing perfectionistic strivings and perfectionistic concerns (Dickie, Surgenor, Wilson, & McDowall, 2012; Stoeber & Damian, 2014). These dimensions broadly map onto the adaptive versus maladaptive perfectionism distinction discussed previously. Evidence for the internal consistency of the CPQ has been adequate to good in studies with large sample sizes, and the scale correlates with other measures of perfectionism and negative affect, demonstrating convergent validity (e.g., Chang & Sanna, 2012).

Measuring Specific Domains of Perfectionism

Self-report measures also exist for measuring perfectionism in the contexts of specific relationships, including romantic relationships, parenting, and families, as well as in specific domains, including body image and sports performance. Various measures also exist for the assessment of perfectionism in children and adolescents (see Egan et al., 2014, for a comprehensive overview of self-report measures).

CLINICAL IMPLICATIONS

Social Anxiety Disorder

The core fears in social anxiety disorder (SAD; i.e., fears of negative evaluation by others) overlap with interpersonal dimensions of perfectionism such as perfectionistic concerns about failing to meet others' expectations. Unsurprisingly, there is an association between maladaptive perfectionism and social anxiety (Juster et al., 1996), and individuals with SAD score higher on some features of maladaptive perfectionism than those with OCD, panic disorder (PD), and nonclinical volunteers (e.g., Antony et al., 1998). In contrast, social anxiety is unrelated to features of adaptive perfectionism,

including personal standards and self-oriented perfectionism (Antony et al., 1998; Nepon et al., 2011; Santanello & Gardner, 2007). Moreover, social anxiety longitudinally predicts increases in self-critical perfectionism (but not the converse), shedding light on the directionality of the relationship (Gautreau, Sherry, Mushquash, & Stewart, 2015).

Standards

Individuals with SAD who are high in perfectionism hold themselves to unrealistic standards for social performance (Juster et al., 1996). For example, beliefs that one must be funny, speak eloquently, and appear relaxed in social settings might lead to avoidant and overcompensatory behaviors that maintain social anxiety (Egan et al., 2014). Not all research findings, however, support this idea, and some even suggest *lower* self-standards among socially anxious individuals (e.g., Wallace & Alden, 1997). Thus, perhaps socially anxious individuals do not set high standards for their own social performance, but do tend to believe that they fail to meet *others'* expectations of them and feel personally inadequate as a result.

Perfectionistic Self-Presentation

Flett and Hewitt (2014) emphasized the importance of perfectionistic self-presentation (PSP; Hewitt et al., 2003) in social anxiety. PSP can be distinguished from dimensions of trait perfectionism in that it involves a drive to *appear*, rather than *be*, perfect. Someone with social anxiety and perfectionism might take considerable effort to present oneself as perfect and may try to cover up or not mention their mistakes to others. One way that socially anxious individuals express PSP is by hiding the effort that it takes to achieve their perfectionistic ideals (Flett, Nepon, Hewitt, Molnar, & Zhao, 2016). For example, after giving a successful presentation, one might tell their classmates that they barely practiced, despite hours of rehearsal the night before.

Perfectionistic Cognitions

We have seen that perfectionism is associated with negative automatic thoughts and rumination about perceived failures and the need to be perfect. Flett and Hewitt (2014) proposed that perfectionistic automatic thoughts contribute to social anxiety in part by exacerbating negative views of the self and making it more likely that socially anxious individuals will perceive deficits in their own social behavior. They also proposed that such individuals tend to ruminate about past social blunders and worry about anticipated future ones. This tendency to engage in postevent and anticipatory processing is reflected in widely accepted cognitive behavior models of social anxiety disorder (e.g., Clark & Wells, 1995), and it follows that these tendencies would be exacerbated in socially anxious individuals with perfectionism given that perfectionism involves preoccupation with mistakes. This cognitive preoccupation is thought to undermine the ability to perform well in social situations—both by diverting attention from relevant social cues and by reducing confidence in the ability to perform well.

Obsessive-Compulsive Disorder

The importance of perfectionism in understanding OCD has long been recognized in theoretical and clinical descriptions of the disorder (Frost & Steketee, 1997). Perfectionism has been recognized as one of three primary domains of cognitions in OCD (Obsessive Compulsive Cognitions Working Group, 2005) and has been described as a risk factor for the development of OCD (Rasmussen & Eisen, 1989).

Control and Harm Avoidance

Individuals with OCD tend to experience a reduced sense of control over their thoughts and environment, as well as an increased desire to control situations (Moulding & Kyrios, 2007). This pattern has been associated with negative psychological outcomes, including anxiety. Some authors have described perfectionism as a means through which individuals with OCD attain their desired level of control in order to reduce the risk of perceived harm, a process that may be especially relevant to contamination obsessions and cleaning compulsions (Frost & Steketee, 2002; Moulding & Kyrios, 2007). Specifically, individuals who experience such obsessions commonly believe that germs or other infectious substances will cause them serious harm and often describe feelings of lack of control over further contamination that might arise thereafter (e.g., believing that the contamination will spread across their body or be transmitted to other people; Rachman, 2004). By compulsively sanitizing one's hands after touching any potentially contaminated surface until a perfect sense of cleanliness is achieved, an individual might feel that he or she has exerted control by reducing the risk of harm that the environment posed.

Incompleteness and Not-Just-Right Obsessions

Some individuals with OCD perform compulsive rituals in response to "not just right experiences" (NJREs), during which they experience dissatisfaction or discomfort with their current state, coupled with the sense that their actions, environments, or perceptions are incomplete or imperfect (Coles, Frost, Heimberg, & Rhéaume, 2003; Summerfeldt, Kloosterman, Antony, & Swinson, 2014). NJREs reflect a unique form of "sensation-based" or "sensory" perfectionism, wherein perceived mismatches between one's perceptual input and expectations are experienced as distressing (Pitman, 1987). Moreover, the prolonged experience of aversive sensory experiences in this context might lead to perfectionistic cognitions. For example, someone continually bothered by the sensation that things are not just right might, over time, come to believe that there "must be a perfect way to do things" (Summerfeldt et al., 2014).

Completing Compulsions Perfectly

Individuals with OCD who are high in perfectionism often set strict rules for how they must complete compulsive rituals (Egan et al., 2014). Take, for example, a woman who fears that a fire will start if she does not check the

appliances in her kitchen before leaving the house. To reduce this anxiety-provoking thought, she has a highly ritualized routine that involves checking the stove followed by the oven, and then moving to the living room to check the iron, and finally to the bathroom to check hair appliances. This routine must be completed three times, in this specific order, before she feels confident that all appliances are off and she will not be responsible for starting a fire. If her routine is interrupted, she must restart the ritual from the beginning, as it must be completed "perfectly" in order for it to be effective.

Panic Disorder and Agoraphobia

Individuals with PD report elevated perfectionism in the form of concerns about mistakes, doubts about actions, parental criticism, and personal standards (e.g., Antony et al., 1998). Interestingly, individuals with PD with agoraphobia score higher than individuals with PD without agoraphobia on several of these factors, suggesting that perfectionism may be an important feature in understanding the onset and maintenance of agoraphobia among individuals with PD (Iketani et al., 2002).

Individuals with PD sometimes hold the belief that they must remain in control of their emotional experiences at all times (Egan et al., 2014); consequently, if they experience any symptoms of anxiety, they may believe that they have failed at meeting this standard. Such high standards for emotional control may interact with the catastrophic misinterpretations of arousal-related body sensations that are common in PD, perhaps leading to perceiving such sensations as indications of weakness and the inability to stay in control. These thoughts might further reinforce the perfectionistic belief that it is necessary to maintain complete emotional control at all times (Egan et al., 2014).

Perfectionism may also manifest in PD and agoraphobia in the tendency to avoid situations in which experiencing panic is possible. For example, individuals with agoraphobia often report that they would be less inclined to avoid feared situations (e.g., taking public transportation, being in a crowded place) if they could be guaranteed that they would not panic. Iketani et al. (2002) suggested that the requirement that one must be firmly convinced that one will not panic in order to enter a given situation can be seen as a perfectionistic tendency. Presumably, this perfectionistic belief may perpetuate anxiety by encouraging or justifying avoidant behaviors.

Generalized Anxiety Disorder

The role of perfectionism in generalized anxiety disorder (GAD) has received relatively little attention, although worry, the key feature of GAD, has been shown to be associated with some aspects of perfectionism (e.g., Santanello & Gardner, 2007). Intolerance of uncertainty, another important feature of GAD, is also correlated with self-oriented perfectionism and socially prescribed perfectionism (Buhr & Dugas, 2006). Moreover, one study showed that among a sample of individuals seeking treatment for perfectionism, concern over

mistakes and personal standards predicted pathological worry in individuals with GAD, and doubts about actions was associated with having a GAD diagnosis (Handley, Egan, Kane, & Rees, 2014).

Santanello and Gardner (2007) found that maladaptive perfectionism leads people to avoid uncomfortable internal experiences (e.g., bodily sensations and negative emotions) by trying to suppress these experiences or avoid events that might give rise to them, a phenomenon known as *experiential avoidance* (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; also see Chapter 7 of this handbook). Experiential avoidance, in turn, has been shown to exacerbate worry (Roemer, Salters, Raffa, & Orsillo, 2005; Santanello & Gardner, 2007). Individuals who worry also demonstrate elevated "evidence requirements" (Stöber & Joormann, 2001; Tallis, Eysenck, & Mathews, 1991), requiring greater certainty about the correctness of their decisions before acting on them—a tendency that may be exacerbated by perfectionism, including concern over mistakes and doubts about actions (Stöber & Joormann, 2001). Finally, while some research supports an association between worry and personal standards, Stöber and Joormann (2001) found that worriers report *lower* personal standards when faced with stress. Accordingly, more work is needed to understand the role of personal standards perfectionism in GAD.

CONCLUSION

Perfectionism is a transdiagnostic phenomenon observed across a range of psychological conditions, most notably among individuals with clinical anxiety. We have provided an overview of this phenomenon, its assessment, and a discussion of how perfectionism serves as a maintenance factor in various forms of clinical anxiety. Perfectionism is a multifaceted construct that interacts with anxiety in different ways, often depending on the particular presentation of anxiety, or anxiety disorder. It is our aim that this chapter will help clinicians recognize when their patients' anxiety is exacerbated by perfectionistic behaviors or beliefs, so that these tendencies can be addressed as part of an integrated treatment plan.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Antony, M. M., Purdon, C. L., Huta, V., & Swinson, R. P. (1998). Dimensions of perfectionism across the anxiety disorders. *Behaviour Research and Therapy*, *36*, 1143–1154. http://dx.doi.org/10.1016/S0005-7967(98)00083-7

Ashby, J. S., Noble, C. L., & Gnilka, P. B. (2012). Multidimensional perfectionism, depression, and satisfaction with life: Differences among perfectionists and tests of a stress-mediation model. *Journal of College Counseling*, *15*, 130–143. http://dx.doi.org/10.1002/j.2161-1882.2012.00011.x

Bieling, P. J., Israeli, A. L., & Antony, M. M. (2004). Is perfectionism good, bad, or both? Examining models of the perfectionism construct. *Personality and Individual Differences*, *36*, 1373–1385. http://dx.doi.org/10.1016/S0191-8869(03)00235-6

Bieling, P. J., Israeli, A., Smith, J., & Antony, M. M. (2003). Making the grade: The behavioural consequences of perfectionism in the classroom. *Personality and Individual Differences, 35,* 163–178. http://dx.doi.org/10.1016/S0191-8869(02)00173-3

Buhr, K., & Dugas, M. J. (2006). Investigating the construct validity of intolerance of uncertainty and its unique relationship with worry. *Journal of Anxiety Disorders, 20,* 222–236. http://dx.doi.org/10.1016/j.janxdis.2004.12.004

Burgess, A. M., & DiBartolo, P. M. (2016). Anxiety and perfectionism: Relationships, mechanisms, and conditions. In F. M. Sirois & D. S. Molnar (Eds.), *Perfectionism, health, and well-being* (pp. 177–203). New York, NY: Springer. http://dx.doi.org/10.1007/978-3-319-18582-8_8

Burns, D. D. (1980). The perfectionist's script for self-defeat. *Psychology Today, 14,* 34–52.

Castro-Fornieles, J., Gual, P., Lahortiga, F., Gila, A., Casulà, V., Fuhrmann, C., . . . Toro, J. (2007). Self-oriented perfectionism in eating disorders. *International Journal of Eating Disorders, 40,* 562–568. http://dx.doi.org/10.1002/eat.20393

Chang, E. C., & Sanna, L. J. (2012). Evidence for the validity of the Clinical Perfectionism Questionnaire in a nonclinical population: More than just negative affectivity. *Journal of Personality Assessment, 94,* 102–108. http://dx.doi.org/10.1080/00223891.2011.627962

Chang, E. C., Sanna, L. J., Chang, R., & Bodem, M. R. (2008). A preliminary look at loneliness as a moderator of the link between perfectionism and depressive and anxious symptoms in college students: Does being lonely make perfectionistic strivings more distressing? *Behaviour Research and Therapy, 46,* 877–886. http://dx.doi.org/10.1016/j.brat.2008.03.012

Chang, E. C., Watkins, A., & Banks, K. H. (2004). How adaptive and maladaptive perfectionism relate to positive and negative psychological functioning: Testing a stress-mediation model in Black and White female college students. *Journal of Counseling Psychology, 51,* 93–102. http://dx.doi.org/10.1037/0022-0167.51.1.93

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 69–93). New York, NY: Guilford Press.

Coles, M. E., Frost, R. O., Heimberg, R. G., & Rhéaume, J. (2003). "Not just right experiences": Perfectionism, obsessive–compulsive features and general psychopathology. *Behaviour Research and Therapy, 41,* 681–700. http://dx.doi.org/10.1016/S0005-7967(02)00044-X

Cox, B. J., Enns, M. W., & Clara, I. P. (2002). The multidimensional structure of perfectionism in clinically distressed and college student samples. *Psychological Assessment, 14,* 365–373. http://dx.doi.org/10.1037/1040-3590.14.3.365

Dickie, L., Surgenor, L. J., Wilson, M., & McDowall, J. (2012). The structure and reliability of the Clinical Perfectionism Questionnaire. *Personality and Individual Differences, 52,* 865–869. http://dx.doi.org/10.1016/j.paid.2012.02.003

Dunkley, D. M., Blankstein, K. R., Halsall, J., Williams, M., & Winkworth, G. (2000). The relation between perfectionism and distress: Hassles, coping, and perceived social support as mediators and moderators. *Journal of Counseling Psychology, 47,* 437–453. http://dx.doi.org/10.1037/0022-0167.47.4.437

Dunkley, D. M., Blankstein, K. R., Masheb, R. M., & Grilo, C. M. (2006). Personal standards and evaluative concerns dimensions of "clinical" perfectionism: A reply to Shafran et al. (2002, 2003) and Hewitt et al. (2003). *Behaviour Research and Therapy, 44,* 63–84. http://dx.doi.org/10.1016/j.brat.2004.12.004

Egan, S. J., Wade, T. D., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: A clinical review. *Clinical Psychology Review, 31,* 203–212. http://dx.doi.org/10.1016/j.cpr.2010.04.009

Egan, S. J., Wade, T. D., Shafran, R., & Antony, M. M. (2014). *Cognitive-behavioral treatment of perfectionism*. New York, NY: Guilford Press.

Enns, M. W., & Cox, B. J. (1999). Perfectionism and depression symptom severity in major depressive disorder. *Behaviour Research and Therapy*, *37*, 783–794. http://dx.doi.org/10.1016/S0005-7967(98)00188-0

Enns, M. W., Cox, B. J., Sareen, J., & Freeman, P. (2001). Adaptive and maladaptive perfectionism in medical students: A longitudinal investigation. *Medical Education*, *35*, 1034–1042. http://dx.doi.org/10.1111/j.1365-2923.2001.01044.x

Fedewa, B. A., Burns, L. R., & Gomez, A. A. (2005). Positive and negative perfectionism and the shame/guilt distinction: Adaptive and maladaptive characteristics. *Personality and Individual Differences*, *38*, 1609–1619. http://dx.doi.org/10.1016/j.paid.2004.09.026

Flett, G. L., & Hewitt, P. L. (2006). Positive versus negative perfectionism in psychopathology: A comment on Slade and Owens's dual process model. *Behavior Modification*, *30*, 472–495. http://dx.doi.org/10.1177/0145445506288026

Flett, G. L., & Hewitt, P. L. (2014). Perfectionism and perfectionistic self-presentation in social anxiety: Implications for assessment and treatment. In S. G. Hofmann & P. M. DiBartolo (Eds.), *Social anxiety: Clinical, developmental, and social perspectives* (3rd ed., pp. 159–187). Amsterdam, The Netherlands: Elsevier. http://dx.doi.org/10.1016/B978-0-12-394427-6.00007-8

Flett, G. L., Hewitt, P. L., Garshowitz, M., & Martin, T. R. (1997). Personality, negative social interactions, and depressive symptoms. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportemen*, *29*, 28–37. http://dx.doi.org/10.1037/0008-400X.29.1.28

Flett, G. L., Nepon, T., Hewitt, P. L., Molnar, D. S., & Zhao, W. (2016). Projecting perfection by hiding effort: Supplementing the perfectionistic self-presentation scale with a brief self-presentation measure. *Self and Identity*, *15*, 245–261. http://dx.doi.org/10.1080/15298868.2015.1119188

Flett, G. L., Russo, F. A., & Hewitt, P. L. (1994). Dimensions of perfectionism and constructive thinking as a coping response. *Journal of Rational–Emotive & Cognitive–Behavior Therapy*, *12*, 163–179. http://dx.doi.org/10.1007/BF02354594

Frost, R. O., Heimberg, R. G., Holt, C. S., Mattia, J. I., & Neubauer, A. L. (1993). A comparison of two measures of perfectionism. *Personality and Individual Differences*, *14*, 119–126. http://dx.doi.org/10.1016/0191-8869(93)90181-2

Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research*, *14*, 449–468. http://dx.doi.org/10.1007/BF01172967

Frost, R. O., & Steketee, G. (1997). Perfectionism in obsessive–compulsive disorder patients. *Behaviour Research and Therapy*, *35*, 291–296. http://dx.doi.org/10.1016/S0005-7967(96)00108-8

Frost, R. O., & Steketee, G. (Eds.). (2002). *Cognitive approaches to obsessions and compulsions: Theory, assessment, and treatment*. Oxford, England: Elsevier.

Gaudreau, P., & Thompson, A. (2010). Testing a 2×2 model of dispositional perfectionism. *Personality and Individual Differences*, *48*, 532–537. http://dx.doi.org/10.1016/j.paid.2009.11.031

Gautreau, C. M., Sherry, S. B., Mushquash, A. R., & Stewart, S. H. (2015). Is self-critical perfectionism an antecedent of or a consequence of social anxiety, or both? A 12-month, three-wave longitudinal study. *Personality and Individual Differences*, *82*, 125–130. http://dx.doi.org/10.1016/j.paid.2015.03.005

Handley, A. K., Egan, S. J., Kane, R. T., & Rees, C. S. (2014). The relationships between perfectionism, pathological worry and generalised anxiety disorder. *BMC Psychiatry*, *14*, 98. http://dx.doi.org/10.1186/1471-244X-14-98

Harvey, A., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive behavioural processes across psychological disorders: A transdiagnostic approach to research and treatment*. Oxford, England: Oxford University Press. http://dx.doi.org/10.1093/med:psych/9780198528883.001.0001

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experimental avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, *64*, 1152–1168. http://dx.doi.org/10.1037/0022-006X.64.6.1152

Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology*, *60*, 456–470. http://dx.doi.org/10.1037/0022-3514.60.3.456

Hewitt, P. L., Flett, G. L., & Endler, N. S. (1995). Perfectionism, coping, and depression symptomatology in a clinical sample. *Clinical Psychology & Psychotherapy*, *2*, 47–58. http://dx.doi.org/10.1002/cpp.5640020105

Hewitt, P. L., Flett, G. L., Sherry, S. B., Habke, M., Parkin, M., Lam, R. W., . . . Stein, M. B. (2003). The interpersonal expression of perfection: Perfectionistic self-presentation and psychological distress. *Journal of Personality and Social Psychology*, *84*, 1303–1325. http://dx.doi.org/10.1037/0022-3514.84.6.1303

Hewitt, P. L., Flett, G. L., Turnbull-Donovan, W., & Mikail, S. F. (1991). The Multidimensional Perfectionism Scale: Reliability, validity, and psychometric properties in psychiatric samples. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, *3*, 464–468. http://dx.doi.org/10.1037/1040-3590.3.3.464

Hewitt, P. L., Habke, A. M., Lee-Baggley, D. L., Sherry, S. B., & Flett, G. L. (2008). The impact of perfectionistic self-presentation on the cognitive, affective, and physiological experience of a clinical interview. *Psychiatry: Interpersonal and Biological Processes*, *71*, 93–122. http://dx.doi.org/10.1521/psyc.2008.71.2.93

Hull, J. G., Lehn, D. A., & Tedlie, J. C. (1991). A general approach to testing multifaceted personality constructs. *Journal of Personality and Social Psychology*, *61*, 932–945. http://dx.doi.org/10.1037/0022-3514.61.6.932

Iketani, T., Kiriike, N., Stein, M. B., Nagao, K., Nagata, T., Minamikawa, N., . . . Fukuhara, H. (2002). Relationship between perfectionism and agoraphobia in patients with panic disorder. *Cognitive Behaviour Therapy*, *31*, 119–128. http://dx.doi.org/10.1080/165060702320337997

Juster, H. R., Heimberg, R. G., Frost, R. O., Holt, C. S., Mattia, J. I., & Faccenda, K. (1996). Social phobia and perfectionism. *Personality and Individual Differences*, *21*, 403–410. http://dx.doi.org/10.1016/0191-8869(96)00075-X

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.

Lizmore, M. R., Dunn, J. G. H., & Causgrove Dunn, J. (2017). Perfectionistic strivings, perfectionistic concerns, and reactions to poor personal performances among intercollegiate athletes. *Psychology of Sport and Exercise*, *33*, 75–84. http://dx.doi.org/10.1016/j.psychsport.2017.07.010

Mor, S., Day, H. I., Flett, G. L., & Hewitt, P. L. (1995). Perfectionism, control, and components of performance anxiety in professional artists. *Cognitive Therapy and Research*, *19*, 207–225. http://dx.doi.org/10.1007/BF02229695

Moulding, R., & Kyrios, M. (2007). Desire for control, sense of control and obsessive–compulsive symptoms. *Cognitive Therapy and Research*, *31*, 759–772. http://dx.doi.org/10.1007/s10608-006-9086-x

Nepon, T., Flett, G. L., Hewitt, P. L., & Molnar, D. S. (2011). Perfectionism, negative social feedback, and interpersonal rumination in depression and social anxiety. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, *43*, 297–308. http://dx.doi.org/10.1037/a0025032

Obsessive Compulsive Cognitions Working Group. (2005). Psychometric validation of the obsessive belief questionnaire and interpretation of intrusions inventory—Part 2: Factor analyses and testing of a brief version. *Behaviour Research and Therapy*, *43*, 1527–1542. http://dx.doi.org/10.1016/j.brat.2004.07.010

O'Connor, D. B., O'Connor, R. C., & Marshall, R. (2007). Perfectionism and psychological distress: Evidence of the mediating effects of rumination. *European Journal of Personality*, *21*, 429–452. http://dx.doi.org/10.1002/per.616

Pirbaglou, M., Cribbie, R., Irvine, J., Radhu, N., Vora, K., & Ritvo, P. (2013). Perfectionism, anxiety, and depressive distress: Evidence for the mediating role of negative automatic thoughts and anxiety sensitivity. *Journal of American College Health*, *61*, 477–483. http://dx.doi.org/10.1080/07448481.2013.833932

Pitman, R. K. (1987). Pierre Janet on obsessive–compulsive disorder (1903): Review and commentary. *Archives of General Psychiatry*, *44*, 226–232. http://dx.doi.org/10.1001/archpsyc.1987.01800150032005

Purdon, C., Antony, M. M., & Swinson, R. P. (1999). Psychometric properties of the Frost Multidimensional Perfectionism Scale in a clinical anxiety disorders sample. *Journal of Clinical Psychology*, *55*, 1271–1286. http://dx.doi.org/10.1002/(SICI)1097-4679(199910)55:10<1271::AID-JCLP8>3.0.CO;2-A

Rachman, S. (2004). Fear of contamination. *Behaviour Research and Therapy*, *42*, 1227–1255. http://dx.doi.org/10.1016/j.brat.2003.10.009

Rasmussen, S. A., & Eisen, J. L. (1989). Clinical features and phenomenology of obsessive compulsive disorder. *Psychiatric Annals*, *19*, 67–73. http://dx.doi.org/10.3928/0048-5713-19890201-06

Rhéaume, J., Freeston, M. H., Ladouceur, R., Bouchard, C., Gallant, L., Talbot, F., & Vallières, A. (2000). Functional and dysfunctional perfectionists: Are they different on compulsive-like behaviors? *Behaviour Research and Therapy*, *38*, 119–128. http://dx.doi.org/10.1016/S0005-7967(98)00203-4

Riley, C., Lee, M., Cooper, Z., Fairburn, C. G., & Shafran, R. (2007). A randomised controlled trial of cognitive–behaviour therapy for clinical perfectionism: A preliminary study. *Behaviour Research and Therapy*, *45*, 2221–2231. http://dx.doi.org/10.1016/j.brat.2006.12.003

Roemer, L., Salters, K., Raffa, S. D., & Orsillo, S. M. (2005). Fear and avoidance of internal experiences in GAD: Preliminary tests of a conceptual model. *Cognitive Therapy and Research*, *29*, 71–88. http://dx.doi.org/10.1007/s10608-005-1650-2

Santanello, A. W., & Gardner, F. L. (2007). The role of experiential avoidance in the relationship between maladaptive perfectionism and worry. *Cognitive Therapy and Research*, *31*, 319–332. http://dx.doi.org/10.1007/s10608-006-9000-6

Shafran, R., Cooper, Z., & Fairburn, C. G. (2002). Clinical perfectionism: A cognitive-behavioural analysis. *Behaviour Research and Therapy*, *40*, 773–791. http://dx.doi.org/10.1016/S0005-7967(01)00059-6

Sherry, S. B., Law, A., Hewitt, P. L., Flett, G. L., & Besser, A. (2008). Social support as a mediator of the relationship between perfectionism and depression: A preliminary test of the social disconnection model. *Personality and Individual Differences*, *45*, 339–344. http://dx.doi.org/10.1016/j.paid.2008.05.001

Smith, M. M., Sherry, S. B., Chen, S., Saklofske, D. H., Mushquash, C., Flett, G. L., & Hewitt, P. L. (2018). The perniciousness of perfectionism: A meta-analytic review of the perfectionism-suicide relationship. *Journal of Personality, 86*, 522–542.

Stöber, J. (1998). The Frost Multidimensional Perfectionism Scale revisited: More perfect with four (instead of six) dimensions. *Personality and Individual Differences*, *24*, 481–491. http://dx.doi.org/10.1016/S0191-8869(97)00207-9

Stöber, J., & Joormann, J. (2001). Worry, procrastination, and perfectionism: Differentiating amount of worry, pathological worry, anxiety, and depression. *Cognitive Therapy and Research*, *25*, 49–60. http://dx.doi.org/10.1023/A:1026474715384

Stoeber, J., & Damian, L. E. (2014). The Clinical Perfectionism Questionnaire: Further evidence for two factors capturing perfectionistic strivings and concerns. *Personality and Individual Differences*, *61–62*, 38–42. http://dx.doi.org/10.1016/j.paid.2014.01.003

Stoeber, J., & Otto, K. (2006). Positive conceptions of perfectionism: Approaches, evidence, challenges. *Personality and Social Psychology Review*, *10*, 295–319. http://dx.doi.org/10.1207/s15327957pspr1004_2

Summerfeldt, L. J., Kloosterman, P. H., Antony, M. M., & Swinson, R. P. (2014). Examining an obsessive–compulsive core dimensions model: Structural validity of harm avoidance and incompleteness. *Journal of Obsessive–Compulsive and Related Disorders*, *3*, 83–94. http://dx.doi.org/10.1016/j.jocrd.2014.01.003

Tallis, F., Eysenck, M., & Mathews, A. (1991). Elevated evidence requirements and worry. *Personality and Individual Differences*, *12*, 21–27. http://dx.doi.org/10.1016/0191-8869(91)90128-X

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, *27*, 247–259. http://dx.doi.org/10.1023/A:1023910315561

Wallace, S. T., & Alden, L. E. (1997). Social phobia and positive social events: The price of success. *Journal of Abnormal Psychology*, *106*, 416–424. http://dx.doi.org/10.1037/0021-843X.106.3.416

Weiner, B. A., & Carton, J. S. (2012). Avoidant coping: A mediator of maladaptive perfectionism and test anxiety. *Personality and Individual Differences*, *52*, 632–636. http://dx.doi.org/10.1016/j.paid.2011.12.009

Zhou, X., Zhu, H., Zhang, B., & Cai, T. (2013). Perceived social support as moderator of perfectionism, depression, and anxiety in college students. *Social Behavior and Personality: An International Journal*, *41*, 1141–1152. http://dx.doi.org/10.2224/sbp.2013.41.7.1141

10

Metacognition

Adrian Wells and Lora Capobianco

Oscar is a 49-year-old teacher diagnosed with generalized anxiety disorder (GAD) who reports that he cannot stop worrying and that he has been a worrier all of his life. He currently worries about terror attacks, his children being involved in accidents, and his own abilities as a teacher. In the past he has worried about a range of topics, including his physical health and the status of his romantic relationships. Oscar believes that all of his excessive worrying means that his mind is "out of control" and that the worrying will lead to a "mental breakdown." At the same time, however, he feels that worrying and analyzing help him solve problems and prepare him should the worst actually happen. To cope with his constant worrying, Oscar sometimes tries distracting himself by watching a movie or TV show or tries to push thoughts out of his mind, but such strategies rarely bring about relief or do so only temporarily.[1]

Metacognition refers to cognitive factors that are involved in monitoring, controlling and interpreting one's own thinking. It is an area of research and theory that arose originally in the field of educational development (e.g., Flavell, 1979) and in the psychology of subjective memory (e.g., Nelson & Narens, 1980). The construct was subsequently formulated as a central causal factor in a transdiagnostic theory of psychological disorders, the Self-Regulatory Executive Function model (S-REF; Wells & Matthews, 1994, 1996). Within this framework, metacognition and the regulation of cognitive processes are the foci of modification in metacognitive therapy (Wells, 2009).

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[1]All clinical case material has been altered to protect patient confidentiality.

Metacognition is divided into three components: (a) knowledge, (b) strategies, and (c) experiences. *Knowledge* refers to the stored information that individuals hold about their own cognition and the factors that influence it; for example, the belief that one has poor short-term memory. In the context of metacognitive therapy, knowledge is conceptualized as a set of beliefs about the importance of thinking, and positive and negative metacognitive beliefs have been distinguished. Positive metacognitive beliefs include the idea that repetitive negative thinking is helpful; for example, a patient might believe that mentally analyzing their previous trauma will help them understand and overcome anxiety. Oscar's belief that his worrying helps him to solve problems and prepares him for the worst is another example. In addition to positive beliefs, negative beliefs have been postulated as central to clinical anxiety in the metacognitive model, such as the belief that worrying is uncontrollable or the belief that some thoughts can cause harm, as illustrated by Oscar's belief that his worrying indicates that his mind is "out of control" and will lead to a "mental breakdown." The belief that thoughts can cause harm is also observed in obsessive-compulsive disorder (OCD). Positive metacognitive beliefs are common in the general population, whereas negative metacognitive beliefs are elevated in clinical groups. As Oscar's case illustrates, positive and negative metacognitive beliefs can coexist among anxious individuals, and can further compromise effective self-regulation efforts; for example, Oscar is conflicted about giving up worry, which leads him to think more in order to try and worry less, but neither of these methods helps Oscar bring his thinking processes under control.

Metacognitive *strategies* are overt and covert behaviors that individuals use to regulate or alter the status of their own cognition. Clinical anxiety is characterized by repetitive negative thoughts, and the strategies anxious individuals use to regulate such thinking are often counterproductive and paradoxically lead to the maintenance of negative metacognitive beliefs or to additional negative thinking. Oscar, for example, copes by engaging in worry, a strategy focused on anticipating that the worst that might happen. Such a process maintains the analysis of threat, and so the anxiety response system is continuously primed. Oscar's use of distraction is another example of a metacognitive strategy, as is the strategy of trying to remove negative thoughts from his mind. A large body of experimental research shows that trying to suppress thoughts (pushing them out of consciousness) is counterproductive in that it paradoxically leads to an increase in the to-be-suppressed thought (Wegner, Schneider, Carter, & White, 1987). In contrast, metacognitive strategies such as social control (e.g., talking to friends about thoughts) and distraction from negative thoughts might be helpful in some situations. For example, distraction may interrupt negative self-referential processing such as worry and rumination resulting in a positive effect on mood (Wells & Matthews, 1994). The goal (or *function*) of using such strategies (as opposed to its form or topography) determines whether the strategy is helpful or maladaptive. The use of distraction to

remove a "dangerous" thought, for example, can have a negative overall effect if it prevents the individual from discovering that thoughts are in fact not dangerous.

Metacognitive *experiences* refer to the in-situation appraisal or subjective feeling associated with the status of cognition. A well-known example is the "tip-of-the-tongue" effect, where it feels as if an item of information is stored in memory even though it cannot be currently retrieved. This in-situation feeling state appears to signal the status of memory. Other experiences, such as in-the-moment interpretations of cognition, are more relevant to clinical anxiety. Oscar's interpretation of his worry as a sign that he is going to have a mental breakdown provides an example of a metacognitive experience. This is an example of an experience that has been called worry about worry (aka *metaworry*; Wells, 1994). Similarly, someone with obsessions might interpret an unwanted image of harming a friend as a sign that they are a sociopath.

CONCEPTUAL IMPLICATIONS

The metacognitive model identifies a pattern of thinking called the *cognitive attentional syndrome* (CAS; Wells & Matthews, 1994), which is a transdiagnostic thinking style that maintains emotional distress such as clinical anxiety. The CAS consists of increased self-focused attention, repetitive thinking (e.g., worry or rumination), threat monitoring, and coping behaviors (i.e., distraction, punishment, social control) that have paradoxical effects on self-regulation. Coping strategies such as distraction, punishment (i.e., punishing oneself for having negative thoughts), and social control (e.g., asking friends if they have similar thoughts) maintain negative processing as they inhibit self-control by conceding to external factors. While self-focused attention is not always problematic, it becomes counterproductive for self-regulation when these states become inflexible. This results in increased internal experiences and greater attentional demands, therefore reducing the ability to select adaptive processing such as retuning cognition to the external threat-free environment. Threat monitoring increases attention for potentially threatening stimuli, which maintains the sense of danger.

A patient with health anxiety, for example, may believe that they are vulnerable to a heart attack and therefore will monitor their heart rate, leading to a constant cycle of monitoring body sensations for potential danger. In these circumstances, the individual's scope for adaptive processing and action is constrained because processing resources and goals are dominated by threat-related processing. For most individuals, periods of emotion such as social anxiety or health anxiety are temporary, since cognition is controlled in a way that leads to the development of a sense of control and responses that meet self-regulatory goals. However, an important factor contributing to anxiety are metacognitive beliefs that give rise to the CAS, which maintains a current sense of threat.

Metacognitive beliefs can be divided into positive and negative beliefs. Negative metacognitive beliefs concern the uncontrollability and danger of worrying or rumination, for example, "I cannot control my worrying." Alternatively, positive metacognitive beliefs concern the usefulness of worrying or threat monitoring, such as, "If I worry, I'll be prepared." In many cases both sets of metacognitive beliefs exist, creating conflicted self-regulation of repetitive negative thinking. For example, health anxious individuals can hold the positive metacognitive belief that thinking the worst about symptoms will mean that they do not fail to act on something that could be important. This leads to constant misinterpretation (worry) about symptoms but also anxiety about giving up this thinking style. At the same time, such individuals might believe that worrying can cause damage to the body. Thus, they are anxious if they continue to worry *and* if they stop worrying, which generates a conflict in the regulation of thinking.

A central idea of this approach is that negative thoughts and beliefs (e.g., "I'm a failure") are normal and transitory experiences. Who hasn't had a negative thought about appearing foolish or failing, for example? What is more important than the *content* of the thought, however, is how the individual regulates cognition and action in response to such thoughts. When the individual engages in extended negative processing (the CAS), it leads to a persistence or spiral of emotion and the likely development of disorder.

The Metacognitive Model

Figure 10.1 depicts a schematic of the role of metacognitive beliefs and the CAS. This is constructed around the A-M-C framework (Wells, 2009) in which an antecedent (A) or trigger thought primes metacognitions (M) leading to extended negative thinking (CAS) resulting in emotional consequences (C), which in this example is clinical anxiety (or an "anxiety disorder"). The starting point in modelling clinical anxiety is the individual's reaction to a negative thought or belief that is dependent on metacognition. When the response includes extended negative thinking, attending to threat, and/or paradoxical coping responses, the sense of danger persists, which is the hallmark of clinical anxiety.[2] Worrying or ruminating persists in response to the trigger thought because the individual believes it is uncontrollable and therefore invests little effort in interrupting the process. However, the person also believes that analyzing failures is a way to cope, and this prolongs negative emotion and maintains the trigger thought for worry. Paradoxical coping strategies are likely to involve attempts to suppress thoughts of failure, because the individual believes that thoughts are dangerous, which the therapist should explore further.

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[2]In Figure 10.1, metacognitive beliefs (knowledge) are represented, but the reader might be interested to know that other dimensions of metacognition such as executive control skills and experiences (appraisal of thoughts) have been omitted for simplicity and the full metacognitive architecture is not displayed.

FIGURE 10.1. A Schematic of the Metacognitive Model of Anxiety Disorder Based on the A-M-C Framework (Wells, 2009)
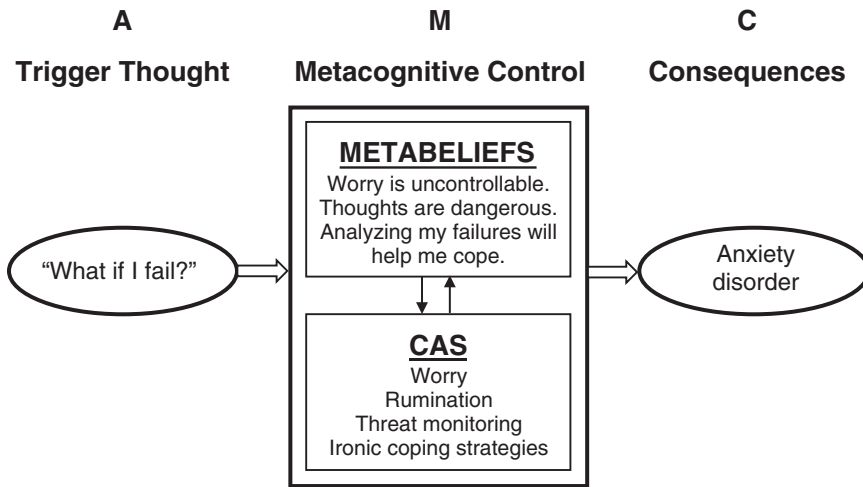
CAS = cognitive attentional syndrome.

ASSESSMENT

Research on the metacognitive model has required the development of a range of assessment and measurement tools, which are listed in Table 10.1. Some of these have undergone substantial psychometric testing. The gold standard measure of metacognitive beliefs is the Metacognitions Questionnaire (MCQ). This measure has five subscales: (a) positive beliefs about worry, (b) negative beliefs concerning uncontrollability and danger, (c) beliefs about the need to control thoughts, (d) low cognitive confidence, and (e) cognitive self-consciousness. There are both a 65-item and a shorter 30-item version of the scale.

Multiple types of metacognitive strategies can be measured with the Thought Control Questionnaire (TCQ), a 30-item self-report measure assessing the following strategies of thought control: (a) distraction, (b) punishment (e.g., beating up on oneself for thinking unwanted thoughts), (c) reappraisal (trying to analyze the unwanted thought), (d) worrying about the thought, and (e) social control (e.g., speaking with someone else about the thought).

Both the MCQ and TCQ are typically used in research settings and higher scores on these measures have been shown to predict poorer treatment outcomes. The MCQ and TCQ have also been adapted for use in children and adolescents (Bacow, Pincus, Ehrenreich, & Brody, 2009; Cartwright-Hatton et al., 2004; Gill, Papageorgiou, Gaskell, & Wells, 2013).

A range of metacognitive measures have been developed that are applicable to individual anxiety disorders. The Thought Fusion Instrument, for example, is used to assess negative metacognitive beliefs in the context of OCD; whereas the Beliefs About Memory Questionnaire is available to assess metacognitions relevant to posttraumatic stress disorder (PTSD). The

TABLE 10.1. Measures of Metacognitive Constructs

Measure	Description and scoring	Psychometric properties
Metacognitions Questionnaire (MCQ-65; Cartwright-Hatton & Wells, 1997)	A self-report scale that assesses positive beliefs about worry (PB), negative beliefs (uncontrollability/danger; UD), superstition/punishment/need for control (NC), cognitive confidence (CC), cognitive self-consciousness (CSC).	Cronbach alphas for the five subscales: PB = .87, UD = .89, CC = .84, NC = .74, CSC = .72.
Metacognitions Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004)	A shortened version of the MCQ-65. It has the same five factors and response format. Total scores range from 30 to 120.	The scale demonstrates good convergent validity, test–retest reliability and internal consistency (Spada, Mohiyeddini, & Wells, 2008; Wells & Cartwright-Hatton, 2004; Yilmaz, Gençöz, & Wells, 2008). Cronbach's alphas for the subscales: CC = 0.93, PB = 0.92, CSC = 0.92, UD = 0.91, and NC = 0.72.
Thought Control Questionnaire (Wells & Davies, 1994)	A self-report measure that assesses thought control strategies across five subscales: distraction, worry, thought control, punishment, and reappraisal.	Good test–retest reliability (r = 0.83). Subscales demonstrate acceptable–good internal consistency with scores from 0.67 to 0.79 (Reynolds & Wells, 1999; Wells & Davies, 1994).
CAS-1 (Wells, 2009)	A self-report scale that evaluates the weekly extent to which individuals engage in worrying, rumination, and threat monitoring, use unhelpful coping strategies, and positive and negative metacognitive beliefs.	The CAS-1 has demonstrated good internal consistency for the overall scale (Cronbach alpha = .86; Fergus, Bardeen, & Orcutt, 2012).
Anxious Thoughts Inventory (Wells, 1994)	A self-report measure that assesses three dimensions of anxious worry: social worry, health worry, and metaworry. The social and health worry subscales are content focused, while the metaworry subscale is processes focused.	Cronbach alphas for the subscales: 0.84 (social worry), 0.81 (health worry), and 0.75 (metaworry).
Meta-Worry Questionnaire (Wells, 2005)	A self-report measure of the frequency and belief dimensions of metaworry in the danger domain.	Cronbach coefficients for the frequency scale were .88 and .95 for the belief scale.

TABLE 10.1. *(Continued)*

Measure	Description and scoring	Psychometric properties
Beliefs About Memory Questionnaire (Bennett & Wells, 2010)	Evaluates beliefs about trauma memory across two subscales: positive and negative beliefs about memory.	The positive belief subscale had a Cronbach alpha of 0.90, and negative beliefs subscale had a Cronbach alpha of 0.70.
Thought Fusion Instrument (TFI; Wells, Gwilliam, & Cartwright-Hatton, 2001)	Evaluates negative meta-cognitive beliefs in OCD across three domains: thought–event fusion, thought–action fusion, and thought–object fusion.	The scale has one factor that demonstrates a Cronbach alpha of 0.89 (Gwilliam et al., 2004).
Beliefs About Rituals Inventory (Wells & McNicol, 2004)	Evaluates individuals' posi-tive beliefs about rituals (typically linked to OCD) using three subscales: behavior and character change, guilt and loss of function, and anxiety.	Total score Cronbach alpha = 0.86, subscale alpha range from 0.77 to 0.87 (McNicol & Wells, 2012).

Note. CAS-1 = Cognitive Attentional Syndrome-1; OCD = obsessive-compulsive disorder.

metacognition-focused clinical interview may be used as a principle means of determining triggers, metacognitions, and the CAS for purposes of generating a clinical case formulation. For example, the following series of questions based on the GAD case formulation interview (Wells, 2009) can be used across various presentations of clinical anxiety:

1. What was the initial thought that triggered your worrying (was it a "what if question," doubt, or image)? [Trigger]
2. What did you then go on to worry about (for how long)? [CAS]
3. How did that make you feel emotionally (anxiety symptoms for example)? [Consequences]
4. What is the worst that could happen if you continue to worry? [Negative metabelief]
5. Could you stop worrying if you wanted to? [Uncontrollability metabelief]
6. Is worrying helpful in any way? [Positive metabelief]
7. When you start worrying what do you do to manage your worry/anxiety? [CAS]
8. Do you ever try to suppress thoughts (get rid of them)? [CAS]
9. Have you ever just decided to leave a trigger thought alone? [Bridge to therapy]

CLINICAL IMPLICATIONS

From a metacognitive perspective, intervention for clinical anxiety is focused on modifying how the individual responds to thoughts, specifically by helping them bring the CAS under adaptive control and then by reducing it. Put another way,

individuals are helped to relate to their thoughts in a new, more adaptive way. This requires the modification of metacognitive beliefs (e.g., the belief that worry is uncontrollable and dangerous) and also the development of new, more healthy, metacognitive strategies. Importantly, this is in contrast to other cognitive therapy techniques that involve analyzing and challenging the validity of the thoughts themselves (e.g., overestimates of threat), which, from a metacognitive perspective would be conceptualized as extended thinking (the CAS).

As an example, someone with a diagnosis of OCD might be asked, "Are there any advantages to worrying about harming someone?" rather than "What are the chances that you will harm someone?" Accordingly, the metacognitive approach has led to the development of intervention techniques designed to modify aspects of the metacognitive system. These techniques are described fully in Wells (2009), and some of the most commonly used techniques are described briefly within the overview of specific anxiety disorders below.

Generalized Anxiety Disorder

Individuals with GAD use worry in order to anticipate future problems and as a coping strategy in response to negative thoughts. For example, a trigger thought might be "What if I get sick and can't work?" In GAD, such cognitions are dealt with by engaging in extended negative thinking (e.g., worrying). From a metacognitive perspective (Wells, 1995, 1997) there are two types of worry: Type 1 and Type 2. Type 1 worry is general worry about external events, social, and physical health concerns (e.g., "What if my partner has an accident, how will I cope, what if its serious, what if I can't cope, how will I care for the family?"). Here, worry is considered a coping strategy and is associated with positive metacognitive beliefs such as, "Worrying helps me to avoid problems in the future" or "Worrying helps me cope." Although such positive metacognitive beliefs play a role in GAD, it is the development and activation of an individual's negative metacognitive beliefs that is the main cause of excessive worry as observed in GAD.

Two negative metacognitive beliefs are important in GAD: (a) negative metacognitive beliefs concerning the uncontrollability of worry and (b) negative metacognitive beliefs concerning the danger or harmfulness of worry (e.g., my worrying is uncontrollable, worrying will cause me to have a heart attack). An individual's negative metacognitive beliefs lead to negative appraisals of worry and introduce worry about worry (i.e., Type 2 worry) into the worry chain. This causes greater anxiety and feelings of being unable to cope. Type 2 worry, also called metaworry (Wells, 1994), increases the sense of immediate danger because the worry process itself becomes a source of imminent threat. Examples of metaworry are "I'm losing control, I'm going crazy, what if I crack up?"

Obsessive-Compulsive Disorder

In OCD, the CAS predominantly comprises worry, rumination, covert and overt rituals, and threat monitoring in order to avoid danger. Threat monitoring is a

coping behavior that involves vigilance for certain thoughts, feelings, or possible contaminants. Examples include monitoring for "bad" or unwanted thoughts, scrutinizing the environment for germs or dirt, and being sensitive for certain feelings or emotions. Other important coping strategies involve overt and covert rituals that are aimed to prevent harm. Examples of covert rituals include praying, forming "safe images," repeating words, or counting. Overt rituals include washing, checking, repeating actions, tidying, aligning objects, and avoidance. These processes are conceptualized as key features of the CAS and driven by the individual's metacognitive beliefs.

Two domains of metacognitive beliefs that are central in OCD are (a) beliefs about the significance or importance of thoughts and feelings, also termed *fusion beliefs* (Wells, 1997), and (b) metacognitive beliefs about the need to perform rituals in response to thoughts and impulses. In applying the metacognitive model to OCD (Wells, 1997) there are three types of negative fusion metabeliefs: thought–event fusion, thought–action fusion, and thought–object fusion. Thought–event fusion is the belief that having an intrusive thought or doubt (e.g., "Has the plane crashed?") can cause an event to occur (e.g., "thoughts about accidents can make them happen"). Thought–action fusion is the belief that thoughts or feelings have the power to cause one to commit unwanted actions (e.g., "having an urge/image of harming someone will make me do it"). Thought–object fusion is the belief that thoughts, feelings, or memories can be transferred into objects (e.g., "I can infect my books with thoughts of the Devil").

Posttraumatic Stress Disorder

The metacognitive model as applied to PTSD (Wells, 2000; Wells & Sembi, 2004) is based on the assumption that after an individual experiences a traumatic event, an intrinsic survival objective is to create a metacognitive plan to guide cognition in the future to avoid potential threat. This process is called the *reflexive adaptation process*, and normally this process is automatic and occurs unhindered. PTSD, however, is caused when this process is interrupted by the CAS. The activation of the CAS consists of the features identified earlier plus "gap filling," a preoccupation with incomplete memory of the trauma and attempts to complete it. Additional unhelpful strategies include avoidance of situations or reminders of the trauma, which are also part of the CAS repertoire. The CAS maintains a sense of current threat, such that the danger (arousal/survival) program continues to run and is inadvertently strengthened. Positive metacognitive beliefs concern the value of engaging in aspects of the CAS. For instance, *gap filling* is driven by the belief that by having a complete memory, the person will be able to identifying blame or responsibility for negative events or that they will be able to avoid future threat or recover quickly. Other positive beliefs concern the use of worry, rumination, threat monitoring, and the need to control negative thoughts. (e.g., "Worrying about my assault will help me to avoid it happening again" "If I don't think about it I will recover"). Negative metacognitive beliefs concern the meaning of thoughts and feelings. For example some patients

who have reported flashbacks believe that they are a sign of brain damage or of imminent mental breakdown.

Social Anxiety

A metacognitive approach to social anxiety emphasizes anticipatory processing (i.e., worry), postevent rumination (i.e., analyzing one's behaviors and responses after an event), and unhelpful coping strategies as found in the CAS. In addition, negative metacognitive beliefs concerning uncontrollability lead socially anxious individuals to continue to worry about themselves (e.g., "What if I look like a fool?").

CONCLUSION

In this chapter, we described the role of metacognition in various presentations of clinical anxiety. Metacognitive phenomena have been examined empirically, with findings demonstrating their relevance to the development and maintenance of clinical anxiety (see Wells, 2009). Moreover, metacognitive therapy, a set of procedures based on metacognitive conceptualizations of anxiety (and other realms of psychopathology), has also been evaluated in numerous clinical trials and is demonstrated to be an effective intervention for anxiety and depression (Normann, van Emmerik, & Morina, 2014). In fact, research suggests that changes in metacognition are part of the mechanisms of action in other treatment modalities used with clinically anxious individuals, such as exposure therapy and cognitive restructuring, despite the fact that these strategies do not explicitly address metacognition (e.g., Fernie, Murphy, Wells, Nikčević, & Spada, 2016; Solem, Håland, Vogel, Hansen, & Wells, 2009).

REFERENCES

Bacow, T. L., Pincus, D. B., Ehrenreich, J. T., & Brody, L. R. (2009). The metacognitions questionnaire for children: Development and validation in a clinical sample of children and adolescents with anxiety disorders. *Journal of Anxiety Disorders*, *23*, 727–736. http://dx.doi.org/10.1016/j.janxdis.2009.02.013

Bennett, H., & Wells, A. (2010). Metacognition, memory disorganization and rumination in posttraumatic stress symptoms. *Journal of Anxiety Disorders*, *24*, 318–325. http://dx.doi.org/10.1016/j.janxdis.2010.01.004

Cartwright-Hatton, S., Mather, A., Illingworth, V., Brocki, J., Harrington, R., & Wells, A. (2004). Development and preliminary validation of the Meta-cognitions Questionnaire—Adolescent Version. *Journal of Anxiety Disorders*, *18*, 411–422. http://dx.doi.org/10.1016/S0887-6185(02)00294-3

Cartwright-Hatton, S., & Wells, A. (1997). Beliefs about worry and intrusions: The Meta-Cognitions Questionnaire and its correlates. *Journal of Anxiety Disorders*, *11*, 279–296. http://dx.doi.org/10.1016/S0887-6185(97)00011-X

Fergus, T. A., Bardeen, J. R., & Orcutt, H. K. (2012). Attentional control moderates the relationship between activation of the cognitive attentional syndrome and symptoms of psychopathology. *Personality and Individual Differences*, *53*, 213–217. http://dx.doi.org/10.1016/j.paid.2012.03.017

Fernie, B. A., Murphy, G., Wells, A., Nikčević, A. V., & Spada, M. M. (2016). Treatment outcome and metacognitive change in CBT and GET for chronic fatigue syndrome. *Behavioural and Cognitive Psychotherapy*, *44*, 397–409. http://dx.doi.org/10.1017/S135246581500017X

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive developmental inquiry. *American Psychologist*, *34*, 906–911. http://dx.doi.org/10.1037/0003-066X.34.10.906

Gill, A. H., Papageorgiou, C., Gaskell, S. L., & Wells, A. (2013). Development and preliminary validation of the Thought Control Questionnaire for Adolescents (TCQ-A). *Cognitive Therapy and Research*, *37*, 242–255. http://dx.doi.org/10.1007/s10608-012-9465-4

Gwilliam, P., Wells, S., & Cartwright-Hatton, S. (2004). Does metacognition or responsibility predict obsessive–compulsive symptoms: A test of the metacognitive model. *Clinical Psychology and Psychotherapy, 11*, 137–144. http://dx.doi.org/10.1002/cpp.402

McNicol, K., & Wells, A. (2012). Metacognition and obsessive–compulsive symptoms: The contribution of thought–fusion beliefs and beliefs about rituals. *International Journal of Cognitive Therapy, Special Section: Cognitive Vulnerability, Stress, and Symptom Specificity in Children and Adolescents*, *5*, 330–340. http://dx.doi.org/10.1521/ijct.2012.5.3.330

Nelson, T. O., & Narens, L. (1980). A new technique for investigating the feeling of knowing. *Acta Psychologica*, *46*, 69–80. http://dx.doi.org/10.1016/0001-6918(80)90060-8

Normann, N., van Emmerik, A. A. P., & Morina, N. (2014). The efficacy of metacognitive therapy for anxiety and depression: A meta-analytic review. *Depression and Anxiety*, *31*, 402–411. http://dx.doi.org/10.1002/da.22273

Reynolds, M., & Wells, A. (1999). The Thought Control Questionnaire—Psychometric properties in a clinical sample, and relationships with PTSD and depression. *Psychological Medicine*, *29*, 1089–1099. http://dx.doi.org/10.1017/S003329179900104X

Solem, S., Håland, A. T., Vogel, P. A., Hansen, B., & Wells, A. (2009). Change in metacognitions predicts outcome in obsessive–compulsive disorder patients undergoing treatment with exposure and response prevention. *Behaviour Research and Therapy*, *47*, 301–307. http://dx.doi.org/10.1016/j.brat.2009.01.003

Spada, M. M., Mohiyeddini, C., & Wells, A. (2008). Measuring metacognitions associated with emotional distress: Factor structure and predictive validity of the Metacognitions Questionnaire 30. *Personality and Individual Differences*, *45*, 238–242. http://dx.doi.org/10.1016/j.paid.2008.04.005

Wegner, D. M., Schneider, D. J., Carter, S. R., III, & White, T. L. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology*, *53*, 5–13. http://dx.doi.org/10.1037/0022-3514.53.1.5

Wells, A. (1994). A multi-dimensional measure of worry: Development and preliminary validation of the Anxious Thoughts Inventory. *Anxiety, Stress, and Coping: An International Journal*, *6*, 289–299. http://dx.doi.org/10.1080/10615809408248803

Wells, A. (1995). Meta-cognition and worry: A cognitive model of generalized anxiety disorder. *Behavioural and Cognitive Psychotherapy, 23*, 301–320. http://dx.doi.org/10.1017/S1352465800015897

Wells, A. (1997). *Cognitive therapy of anxiety disorders: A practice manual and conceptual guide*. Chichester, England: Wiley.

Wells, A. (2000). *Emotional disorders and metacognition: Innovative cognitive therapy*. Chichester, England: Wiley.

Wells, A. (2005). The metacognitive model of GAD: Assessment of meta-worry and relationship with *DSM–IV* generalized anxiety disorder. *Cognitive Therapy and Research*, *29*, 107–121. http://dx.doi.org/10.1007/s10608-005-1652-0

Wells, A. (2009). *Metacognitive therapy for anxiety and depression.* New York, NY: Guildford Press.

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: Properties of the MCQ-30. *Behaviour Research and Therapy*, *42*, 385–396. http://dx.doi.org/10.1016/S0005-7967(03)00147-5

Wells, A., & Davies, M. I. (1994). The Thought Control Questionnaire: A measure of individual differences in the control of unwanted thoughts. *Behaviour Research and Therapy*, *32*, 871–878. http://dx.doi.org/10.1016/0005-7967(94)90168-6

Wells, A., Gwilliam, P., & Cartwright-Hatton, S. (2001). *The Thought Fusion Instrument* (Unpublished self-report scale). University of Manchester, England.

Wells, A., & Matthews, G. (1994). *Attention and emotion: A clinical perspective*. New York, NY: Psychology Press/Taylor & Francis.

Wells, A., & Matthews, G. (1996). Modelling cognition in emotional disorder: The S-REF model. *Behaviour Research and Therapy*, *34*, 881–888. http://dx.doi.org/10.1016/S0005-7967(96)00050-2

Wells, A., & McNicol, K. (2004). *The Beliefs about Rituals Inventory* (Unpublished self-report scale). University of Manchester, England.

Wells, A., & Sembi, S. (2004). Metacognitive therapy for PTSD: A core treatment manual. *Cognitive and Behavioral Practice*, *11*, 365–377. http://dx.doi.org/10.1016/S1077-7229(04)80053-1

Yilmaz, A. E., Gençöz, T., & Wells, A. (2008). Psychometric characteristics of the Penn State Worry Questionnaire and Metacognitions Questionnaire-30 and metacognitive predictors of worry and obsessive–compulsive symptoms in a Turkish sample. *Clinical Psychology & Psychotherapy*, *15*, 424–439. http://dx.doi.org/10.1002/cpp.589

11

Autobiographical Memory Bias

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Dev was a cashier who found it very difficult to attend social functions where he would have to mingle with small groups of people. He was afraid that when he interacted with people they would notice that he was anxious, sweating, and blushing. Whenever Dev had an event to attend, he would picture himself from an observer's perspective, standing in front of a crowd with a bright red face like a tomato, with sweat dripping profusely from his chin. When he anticipated attending the social function, he found it very difficult to stop this image from coming to mind: it was intrusive and anxiety provoking, and he knew that this image in his mind's eye was exactly how other people would see him when he attended the event. Sometimes Dev would avoid the event so that his fears would not come true, and other times he tried to hide his signs of anxiety by standing off to the side or not talking much. At first Dev was not sure where this image had come from despite feeling like it had been with him forever. When probed to trace the image back, he realized that it had first emerged when he was in high school. He remembered attending a party where he had spilled a drink all over his date and everybody had laughed at him. Dev felt very embarrassed and he turned bright red. He remembered that after this event it became harder to attend parties and social gatherings, especially because he was worried that people would notice his blushing and sweating. Even though there had been times where he did not sweat and blush he always envisioned the same image, and to Dev, this image represented his incompetence.[1]

In this case example, Dev's autobiographical memory of a past, socially pain-ful experience is preferentially retrieved when encountering social situations, even though he has had previous positive experiences in social gatherings. This memory comes to him in the form of anxious visual imagery. This image serves to maintain his feelings of anxiety and avoidance because Dev formulates his expectations of future social situations on the basis of his past experiences, and he believes this image to be an accurate representation of how others will see him in social situations. To protect himself from reliving this negative predic-tion, Dev uses safety behaviors (e.g., avoiding conversations; see Chapter 2). These behaviors ease his anxiety in the moment but also "hijack" his attention, preventing him from devoting attentional resources to the task at hand, and potentially noticing and later remembering positive aspects of the event that may help him update the image and his associated network of memories. In Dev's case, avoidance reinforces the negative autobiographical memory, which strengthens his schema (i.e., pervasive mental framework) about the "danger" of social functions.

Autobiographical memory consists of personally remembered experiences and information that provide knowledge about the self. Autobiographical memory consists of two components: (a) recollections of specific episodes or events that happened at a particular time and place, which can be consciously accessed and retrieved (i.e., Dev remembers attending a party where he spilled a drink all over his date, he blushed, and everybody laughed at him) and (b) general semantic knowledge about the self that is derived from such memories (i.e., Dev knows that he always blushes in social situations and this means he is incompetent). Autobiographical memory is inherent to human functioning. It enables us to remain oriented in the world, to pursue goals effectively in light of past problem-solving, and to regulate emotions and self-care (M. Moscovitch, Cabeza, Winocur, & Nadel, 2016; Williams et al., 2007). Moreover, our ability to imagine future events and simulate alternative perspectives is facilitated by having a memory system that can flexibly draw upon and recombine details of past events (Schacter et al., 2012). The reconstructive nature of autobio-graphical memory can be adaptive and supportive of healthy functioning, but it may also be biased (e.g., "sins of memory" described by Schacter, 2001).

For these reasons, it is not surprising that autobiographical memory may play a key role in maintaining psychopathology. Healthy individuals also experience and encode threatening information and report negative autobio-graphical memories of past events. However, for individuals diagnosed with fear and anxiety disorders, the impact of negative autobiographical memories appears to be more extreme and plays a greater role in influencing cognition and behavior. In individuals with anxiety, the emotional significance and appraisal of particular autobiographical memories, their relationship to their self-schema, and the extent to which anxiety-related autobiographical memo-ries come to mind differentiate their autobiographical memory from that of the general population. It is unlikely that individuals with anxiety have a funda-mentally biased system, but that normal autobiographical memory processes maintain clinical fear and anxiety by operating within a system that prioritizes information relevant to anxiety (see Berntsen, 2012). Although individual

anxiety disorders share some common elements (e.g., physiological response elements, escape or avoidance responses), what is prioritized depends on each individual and the specific pathological elements of their underlying fear structure (Foa, Huppert, & Cahill, 2006). The result of this experience is an autobiographical memory system that supports information thematically relevant to an individual's fear. A cue that would elicit retrieval of negative autobiographical memories for one individual may be different for another individual.

AUTOBIOGRAPHICAL MEMORY INCLUDES EPISODIC AND SEMANTIC COMPONENTS

Episodic and semantic components of autobiographical memory represent two pathways to self-knowledge, each of which may contribute to the maintenance of clinical fear and anxiety. The process of episodic recollection encompasses an experiential component termed *autonoetic consciousness*, which involves an awareness that the particular event is unique to that individual's past experience (Tulving, 1985). As such, episodic memories of specific salient past events provide a way for people to exist beyond the present moment, allowing them to perform various self-projections and engage in "mental time travel" from recollected past to imagined future events (Schacter et al., 2012). Episodic memories also provide a template for the simulation of personal goal-directed scenarios and problem-solving in the context of novel situations (M. Moscovitch, 2012).

In individuals with anxiety, negative or traumatic personal events appear to be recalled and retrieved (voluntarily or involuntarily) in particularly rich and vivid episodic detail (e.g., D. A. Moscovitch et al., 2018). Access to rich autobiographical details related to anxiety can contribute to biased self-projections or evoke biased solutions to current and future problems. Specific autobiographical memories can contribute to anxiety by providing exemplar templates of fear, which are drawn upon and influence how an individual responds in anticipation of or during anxiety-provoking situations.

Most episodic memories are transformed and assimilated over time into higher-order autobiographical representations, so that they become more schematic and semantic, encapsulating the central gist of the event or experience rather than a rich episodic memory representation per se (M. Moscovitch, 2012). Given that semantic memories do not depend on the ability to retrieve episodic memories of the events that led to the creation of particular schemas or self-beliefs, the use of semantic information can provide a quick route to schema-based cognitions and behaviors. In anxiety disorders, relying on negative schematic information represented in semantic memory can maintain maladaptive core beliefs, which contribute to the inability to access more adaptive, alternative modes of thinking and behaving (Beck, Emery, & Greenberg, 2005; D. A. Clark & Beck, 2010). Semantic memory also provides a frame through which people retrieve, assemble, and interpret relevant episodic details from

memory (D'Argembeau, 2012). For example, Dev has an image of himself blushing, drawn from a specific episode, which over time has come to represented an amalgamation of blushing experiences, providing him with semantic knowledge of the negative self-relevant consequences of attending anxiety-provoking situations (i.e., he will blush and people will believe he is incompetent).

THE ORIGIN OF AUTOBIOGRAPHICAL MEMORY BIAS

Although it may be intuitive to assume that problems with fear and anxiety develop because of an aversive conditioning experience, not all individuals with anxiety recall such an event. Alternatively, autobiographical memory may maintain specific fears through other episodic learning experiences, which are then abstracted and incorporated into the individual's semantic knowledge base (e.g., learning that snakes are dangerous during a school class and then having a parent endorse this belief). Therefore, autobiographical memory may maintain anxiety by contributing to a sense of knowing that a certain stimulus is dangerous, without the recollection of a specific episodic experience.

People tend to easily remember information that supports or confirms their schema. Individuals with anxiety are more attentive to fear-relevant and emotionally salient stimuli in their environment, which increases the likelihood that such event details are encoded into memory (D. A. Clark & Beck, 2010). Preferential encoding may then facilitate the storage and retrieval of negative autobiographical memories, which in turn are maintained by cognitive processes that elaborate associative links to negative events in the past, thereby strengthening memory traces.

AUTOBIOGRAPHICAL MEMORY AND SENSE OF SELF

All individuals have their own memory biases that aim to provide them with a coherent and stable sense of self over time. Autobiographical memories provide the raw material from which identity is constructed (e.g., Fitzgerald, 1992) and a platform to create life stories, continually influencing self-representation in different contexts. However, the memory-system is limited and not all autobiographical memories are retained, nor are memories veridical accounts of an event.

The self-memory system (SMS) provides a theoretical framework for understanding how and why autobiographical memories are retained. According to the framework, individuals' sense of self (including self-beliefs and knowledge) is confirmed and supported by their autobiographical memory system, which comprises their life stories, knowledge relating to lifetime periods, summaries of extended and repeated events, and episodic details of specific events (Conway & Pleydell-Pearce, 2000). A central tenet of the model is the

process of *coherence*. Coherence acts at encoding and consolidation, retrieval, and reencoding to shape an individual's memories—including the accessibility of memories and content of autobiographical knowledge—in a way that is consistent with their current goals, self-images, and self-beliefs (see Conway, 2005). For example, Dev might be more likely to encode information during social situations that supports his self-schema of incompetence (e.g., the "grimace" on his interaction partner's face when he slurs his speech, the physiological sensations that signify his blushing).

The SMS stipulates that autobiographical memories are reconstructed in accordance with an individual's current sense of self, or *working self*, which organizes and processes the psychological present on the basis of personal goals and interacts with an individual's active self-schemas and autobiographical memory base. This point is particularly relevant to fear and anxiety disorders, as they are often characterized by distorted self-representations that have an overbearing influence on cognition and behavior. Autobiographical memories consistent with the anxious self that are continuously drawn upon to support individuals' anxious and fearful self-conceptualizations are often deemed "self-defining."

Self-defining memories stand out as exemplar memories of experiences and are affectively intense, repetitive, and vivid (Singer & Salovey, 1993). Because of the personal significance of these memories, self-defining memories typically comprise narratives that individuals draw on to inform their sense of identity and encompass powerful scripts for actions, affect, and outcomes (Conway, 2005). This is particularly true for posttraumatic stress disorder (PTSD), because traumatic experiences often alter an individual's self-construct (Sutherland & Bryant, 2005). Self-defining memories are not restricted to memories that meet the criterion for a traumatic event according to the *Diagnostic and Statistical Manual of Mental Disorders* (fifth ed. [*DSM–5*]; American Psychiatric Association, 2013) but are also present in the memories of patients diagnosed with other anxiety and fear-based disorders. Individuals who are socially anxious tend to report more anxiety-related self-defining memories and endorse traumatic social experiences as being particularly influential of and consistent with their views of themselves, others, and the world (e.g., Krans, de Bree, & Bryant, 2014; D. A. Moscovitch et al., 2018); for individuals with agoraphobia and health anxiety, memories of traumatic situations can also result in negative appraisals of the self (e.g., Hackmann, Day, & Holmes, 2009; Muse, McManus, Hackmann, Williams, & Williams, 2010).

One consequence of possessing anxiety-related self-defining memories is that retrieval of such memories may not only maintain anxious mood states and negative self-perceptions but also influence the capacity to consider positive experiences that are contrary to the negative memories (Sutherland & Bryant, 2005). Moreover, anxious self-defining memories may have undue influence on an individual's affective and behavioral responses in the moment or when anticipating future anxiety-provoking situations. In instances when an experience is incompatible with an individual's long-term goals, the control

processes of the working self may act to edit memory content to maintain long-term self-coherence. For instance, an individual with PTSD saw himself as a highly skilled and controlled driver; his memory of a traumatic car crash was distorted such that he believed he could have stopped the event from happening (Conway, 2005).

THE ROLE OF MENTAL IMAGES

Mental images are mental representations that possess sensory qualities (e.g., visual, audio, olfactory), as if "seeing with the mind's eye or hearing with the minds ear" (Kosslyn, Ganis, & Thompson, 2001, p. 635). Mental images access sensory information from memory rather than from direct perception and as such, can encompass memory fragments, reconstructions, dreams, and symbols that stand for objects, feelings, or ideas (Horowitz, 1970). Whether they are spontaneously triggered or deliberately self-generated, mental images commonly feature in individuals' internal worlds and may coincide with memories, thoughts, emotions, and self-representations (Holmes & Mathews, 2010).

Intrusive imagery is featured specifically in *DSM–5* (American Psychiatric Association, 2013) criteria for PTSD and obsessive-compulsive disorder (OCD) but is also prevalent in other fear and anxiety disorders. Intrusive images often originate from a particular autobiographical memory that either coincided with the onset of the disorder or exacerbated the disorder presentation. The images typically consist of a rich sensory representation of what occurred in the autobiographical experience, and if not identical in content, tend to be thematically similar to the memory from which they were derived (for further information, see Brewin, Gregory, Lipton, & Burgess, 2010; Stopa, 2009).

Although intrusive imagery in fear and anxiety disorders has been linked to traumatic experiences (e.g., physical or sexual assault or abuse), intrusions may also originate from less severe experiences (e.g., arguing with significant others; being teased, criticized, bullied, and humiliated; Çili & Stopa, 2015). Not all intrusive images arise directly from an adverse experience, however, and images tend to lie on a continuum ranging from actual episodic memories to entirely hypothetical situations. Nonetheless, even images that are fantasy-based still appear to contain memory-related material and to draw on brain circuitries that correspond with episodic memory (Brewin et al., 2010). It is likely that recurrent and intrusive images in anxiety disorders may provide a pathway through which autobiographical memories maintain clinical fear and anxiety.

The meaning derived from autobiographical memories may be represented through images (Çili & Stopa, 2015), such that the meaning of the memory may "live on" in the intrusive image and become part of one's semantic autobiographical knowledge. In clinical anxiety, self-images can represent an

individual's feared self or some state to be avoided (e.g., threats to the integrity of self; Stopa, 2009), and it is this self that often takes a front seat in driving their anxious behavior. Recurrent images can also preserve the belief that the image is a realistic portrayal of the individual, or a probable outcome that is likely to occur. In the case example, Dev's repetitive and intrusive image of himself blushing in a social situation maintained his belief that he would always blush in social situations, and that this would mean he was incompetent. Similarly, an intrusive flashback of a traumatic experience in PTSD can elicit physiological arousal and perceived threat from new situations, which may increase the likelihood of behavioral avoidance but also avoidance of emotional processing of the traumatic memory necessary to move on from the event (Foa & Jaycox, 1999).

THE ROLE OF EMOTION

The impact of emotion on memory for autobiographical events is complex and involves many different factors. Some of the most important factors are briefly summarized next.

Emotional arousal experienced during the event and also the affective valence of the event (i.e., negative or positive affect) may influence the degree to which the event, or specific event details, are remembered (Holland & Kensinger, 2010). Physiological arousal boosts consolidation of memory traces through activation of the amygdala (McGaugh, 2004). This process can function to narrow memory focus for central information. Patients with PTSD sometimes report tunnel vision in their traumatic flashbacks, such that the memory contains a central event (e.g., a gun) without contextual details (LaBar, 2007). Emotion also influences the perceptual and phenomenological properties of autobiographical memories, such as the vividness and narrative details and the extent to which the memory is relived on retrieval. Because the emotional arousal experienced during the event is encoded into the episodic memory trace, retrieval of the episodic information reactivates emotional systems and contributes to the feeling of reliving or reexperiencing the past event (LaBar, 2007). Additionally, emotional arousal may confer mnemonic benefits because of influence on cognitive factors, such as attentional focusing and distinctive processing and organization, which allow emotionally salient features of complex events to be processed relatively automatically and preferentially retained in memory (Talmi, 2013). For example, when Dev perceives that he is under social threat and his levels of emotional arousal increase, it may lead to preferential processing of signs of incompetence.

In individuals with anxiety, elaborative cognitive processes (e.g., repeated rumination, postevent processing) may serve to retrospectively imbed negative meaning and emotion into an event memory, whereas anticipatory rumination might facilitate enhanced attention to and encoding of upcoming negative

details prioritized as central to the event. Moreover, repeated rehearsal of a negative experience via rumination can increase the likelihood that embellished details of that negative experience are encoded as part of the episodic/autobiographical memory, which may hinder individuals' ability over time to distinguish between real memory details and imagined details that feel real but may have never actually occurred (see Hertel, Brozovich, Joormann, & Gotlib, 2008; M. Moscovitch, 2008). In the case example, Dev remembers that everybody laughed at him when he spilt his drink; however, this description may represent an embellishment that has occurred because of Dev's focus on social threat within the situation and ruminative processing following the situation. Although Dev's anxiety makes him feel certain that everybody noticed, it is unlikely that this is the case; this embellishment, however, can serve to perpetuate the overestimation of the probability and cost of future social experiences. Retrieval of past negative experiences can then also prime anxious individuals to perceive threat from current or future situations, as reflected in hypervigilance or avoidance to potential threats (Brown et al., 2013), thus increasing the likelihood that new "threats" will be encoded into the memory network and may further potentiate the tendency for individuals to imagine and anticipate negative futures (Sansom-Daly, Bryant, Cohn, & Wakefield, 2014).

ASSESSMENT

Even in fear-related disorders where a negative event may not have caused symptom onset, identifying past autobiographical experiences can facilitate the treatment process. Such memories can provide clinicians with a looking glass into the development of underlying schemas, including negative core beliefs the individual holds about self, others, and the world, which can often be derived from such experiences. Understanding the autobiographical experiences that contribute to patient cognition and behavior not only facilitates enhanced empathic attunement toward the patient's experience but can also help to identify targets of treatment, such as the conditional rules and assumptions derived from the past experience(s) that perpetuate maladaptive behavior.

It is the very nature of autobiographical memory that makes biases idiosyncratic to the individuals who experience them. Many individuals may spontaneously recall past negative experiences that contribute to their current levels of anxiety, which colors their predictions about what will happen in future feared situations. It is likely that they may also report spontaneous mental images which fuel the cycle of anxiety. Some individuals can readily draw links between intrusive images and memories, whereas for others, specific autobiographical events may be less accessible. In these cases, intrusive images could provide a gateway to particularly salient autobiographical memories. Cognitive strategies assessing core beliefs can also provide an avenue for accessing salient memories that contribute to an individual's fear. Clinicians

may ask the following questions: "Where do you think this belief might have come from?" "Is there a specific mental image or memory that comes to mind when you think about that?" "Can you access any significant pictures or sensory representations in your mind's eye, which may or may not be related to an actual personal event that you experienced in the past?"

Following identification of pertinent autobiographical memories, it is useful for clinicians to guide patients to offer a freely recalled narrative of the event in as much detail as possible (Thomsen & Brinkmann, 2009). From the patient's memory description, it is often possible for the clinician to infer how the patient appraises the event, in terms of its emotional salience and meaningfulness or to use the patient's description as a foundation for further questioning. Understanding the meaning (versus mere content) of the memory is crucial, as such an understanding will help to guide individualized case conceptualization and treatment.

Although clinical interviewing methods may provide the opportunity to uncover deeper meaning associated with particular autobiographical memories, some important facets of the memory description may best be captured by standardized instruments that aim to distinguish elements of autobiographical memory or the process of memory retrieval. There are a number of instruments that aim to elucidate the features of autobiographical memory that may be used in clinical populations (for some examples, see Zlomuzica et al., 2014). It is important to note that methods of assessing autobiographical memory can be time intensive, so clinicians are encouraged to use methods most relevant to their patient.

In their own work, the authors have used the Waterloo Images and Memories Interview (D. A. Moscovitch, Gavric, Merrifield, Bielak, & Moscovitch, 2011), a structured interview that elicits mental images and episodic memory narratives related to anxiety provoking social situations. The narratives are then coded for descriptive detail, and beliefs associated with the autobiographical memories are assessed with the Core Beliefs Module. This supplementary module uses the cognitive behavioral "downward arrow" approach to explore core beliefs associated with the individual's negative image and memory (see Reimer & Moscovitch, 2015).

Clinicians may also wish to gain an understanding of the phenomenological aspects of the memory (e.g., vividness, self-perspective, state of consciousness), how the memory is experienced by the patient (e.g., intrusiveness, intensity, emotional valence), and how it is appraised (e.g., influence on beliefs). These features may be targeted by additional coder rating schemes (e.g., coding disorder-relevant content; Witheridge, Cabral, & Rector, 2010), or with patient self-report measures (e.g., the centrality of events scale—Berntsen & Rubin, 2006; the memory characteristics questionnaire—Johnson, Foley, Suengas, & Raye, 1988). Such supplemental materials can provide important clues as to the impact particular autobiographical memories have for the patient and the meaning associated with the memories, which may serve to benefit treatment beyond an initial assessment.

CLINICAL IMPLICATIONS

As noted previously, autobiographical memory processes are reconstructive. Although this feature can be advantageous, it can also serve to promote cognitive biases that maintain high levels of fear, worry, and avoidance.

Fear of Animals, Environment, Vomiting, Blood, Injection or Injury, and Situations

Fear of animals, elements of the natural environment, blood, injection or injury, specific situations (e.g., planes, elevators), or other fears such as choking or vomiting are commonly organized under the *DSM–5* diagnosis of specific phobia (American Psychiatric Association, 2013). Autobiographical memories of aversive experiences with phobic stimuli, engendered by the individual's direct experience or learning of others' experiences, may maintain fear and anxiety because of avoidance (e.g., the memory of being bitten by a dog as a child fuels the belief that dogs are dangerous, and one should avoid situations in which dogs may be encountered to subdue feelings of anxiety and remain out of harm's way). Alternatively, remembering a story on the news about someone dying after being trapped in an elevator instills a fear of elevators (or enclosed spaces more generally).

Intrusive images are also common and may be triggered by various phobic cues. For example, in vomiting phobia, negative images may be triggered by seeing someone who looks unwell or by feelings of nausea (Price, Veale, & Brewin, 2012). Similarly, individuals with needle phobia might experience intrusive images related to pain whenever they see a needle or confront a doctor's waiting room. Images can reflect actual memories of feared experiences in which they encountered the phobic stimulus directly, experiences that contain content and emotional meaning related to the phobic stimulus, or "worst-case scenarios" (e.g., other negative memories of pain for those afraid of needles, memories of disgust for those afraid of spiders). Recurrent retrieval of aversive memories or future scenarios coincide with verbal worry and physiological anxiety sensations that increase an individual's perception that the feared consequence is likely to occur. In vomit phobia, retrieval of aversive memories commonly includes images of vomiting but also nauseous sensations, which strengthens the belief that vomiting inevitably follows nausea (Veale, 2009).

Fear of Negative Self-Exposure and Negative Evaluation

Fear of exposing negative self-attributes for evaluation by critical others may be perpetuated through increased accessibility of memories relating to events where the individual appeared foolish, was criticized, or felt embarrassed or humiliated. In the face of anxiety-provoking cues or following anxiety-provoking situations, the autobiographical memory system of individuals with social anxiety tends to favor the recall of "social failures" and negative information (see Morgan, 2010, for a review).

Although we all have memories of negative social experiences, individuals with higher levels of social anxiety and evaluative concerns recall them more vividly and appraise them as more emotionally meaningful and even traumatic. Indeed, they tend to recount past social events with more self-referential information and higher levels of self-conscious emotions (e.g., Anderson, Goldin, Kurita, & Gross, 2008), which can maintain the negative impact of the event. Moreover, the recall of socially stressful events can also elicit avoidance and hyperarousal responses that are akin to the responses of patients diagnosed with PTSD who have experienced events that meet the *DSM–5* criteria for traumatic incidents (American Psychiatric Association, 2013; Erwin, Heimberg, Marx, & Franklin, 2006).

The content of what is remembered may also differ for people with social anxiety, such that they recall a greater number of episodic details associated with negative social experiences (D. A. Moscovitch et al., 2018). Increased episodic detail may underlie increased vividness and the feeling of reliving salient negative events when they come to mind, and could provide biased building blocks for simulating future anxiety-provoking scenarios. Retrieval of episodic detail may suggest that the event has been encoded in more detail at the time (as is the case for emotionally laden events) or that particularly salient details of the event have been rehearsed and elaborated during repeated rumination and postevent processing, as noted previously.

Cognitive models of social anxiety disorder and body dysmorphic disorder, in which fear of negative evaluation are paramount, have clearly held that negative self-imagery is central to the maintenance cycle of the disorder (D. M. Clark & Wells, 1995; Rapee & Heimberg, 1997; Veale, 2004). Intrusive images may come to mind when anticipating, entering, or even following social situations, when worrying about appearance or looking in the mirror or during ruminative episodes, for example. The images (typically viewed from an observer perspective) are usually distorted and unrealistic and often depict the individuals' fear of what will occur in the situation (e.g., an auditory representation of themselves stuttering or sounding quiet and awkward, a picture of people making fun of their perceived flaw, a disproportional focus on a "defective" feature; Osman, Cooper, Hackmann, & Veale, 2004).

The continuous retrieval of negative images and associated memories maintains self-focused attention along with a view of what the individual will look like and feel like in anxiety-provoking situations, and strengthens maladaptive beliefs about their perceived flaw (e.g., a distorted image of an enormous and disfigured nose alongside efficient retrieval of autobiographical memories of feeling self-conscious while sitting alone during social get-togethers maintains the belief that one is ugly and abnormal).

Fear of Intrusive Thoughts, Contamination, and "Not Just Right" Experiences

One way that autobiographical memories maintain fear in OCD is that they provide a source of internal and external stimuli that evoke obsessional thoughts,

feelings of discomfort and anxiety, and compulsive behavior. A range of distinct memories can provide a source of mental contamination (Coughtrey, Shafran, Lee, & Rachman, 2012), including memories associated with moral violation or betrayal (e.g., prompting the urge to wash in victims of sexual assault; Fairbrother & Rachman, 2004), memories of criticism (e.g., childhood memories of belittlement), or other types of negative memories that evoke feelings of disgust (e.g., the memory of finding a dead body) or shame. Coughtrey and colleagues (2012) described one patient with OCD who reported being unable to use a chair in their home because someone unpleasant had sat on it 10 years previously, illustrating not only the persistence of autobiographical memories in maintaining anxiety but also suggesting that associative links in autobiographical memory can proliferate and elaborate fear. Recurrent retrieval of contamination experiences in neutral contexts might trigger contamination fears and support the subsequent encoding of neutral or uncontaminated stimuli as being polluted, which in turn contributes to the overlap between contact and mental contamination (Coughtrey et al., 2012).

As in other fear domains, intrusive imagery provides an avenue for the recurrent retrieval of distressing memories, as such images are often connected to a disturbing memory and incorporate personally significant past events (Rachman, 2007). At other times, formative beliefs associated with personally significant memories are reflected in images that might not obviously link to the memory at first glance. Speckens, Hackmann, Ehlers, and Cuthbert (2007) described a patient's image of herself covered in feces and urine, having wrinkles, and looking horrible. On further assessment, the patient reported that this image meant that she was a bad person and said that she would react to the image by punishing herself physically, by scratching her body or walking into things intentionally. The image was associated with feelings of strong guilt in relation to earlier memories of having treated her mother badly as a child.

Intrusive images and memories can also serve to maintain compulsive behavior by disrupting the act of compulsions, such that the compulsive behavioral sequence must be restarted. de Silva (1986) reported the case of a patient who had intrusive images related to past memories of homosexual acts that were to be cleansed with prayers to God in a certain sequence. However, whenever the sequence was interrupted by intrusive images, the patient felt compelled to restart the process from the beginning.

Notably, although obsessional images may reflect a reactivation of a stress experience or other personally significant event, many images described by patients with OCD incorporate unusual, unrealistic, and fantasy-based elements (de Silva, 1986). Elaborative cognitions and images that seem incongruent with reality might be instigated by self-beliefs that underlie the autobiographical memory system and reveal something terrible about the patient's identity (e.g., "I am immoral," "I am dangerous," "I am personally responsible"; Salkovskis, 1989). Intrusive memories, then, can serve to maintain beliefs that form the object of obsessions and compulsions and can also incite self-doubt relating to the individual's own character.

Fear of Somatic Cues and the Consequences of Panic Symptoms

Fear of somatic cues and symptoms, as in panic disorder and agoraphobia, are often represented in the mind's eye by anxious imagery linked to specific autobiographical memories. Imagery in panic disorder can include vivid memories of previous threatening experiences and sensations (Ottaviani & Beck, 1987). In agoraphobia, images can reflect memories of instances where the physical integrity of the self was threatened and/or felt vulnerable (e.g., being stranded alone in a supermarket, being bullied for being small, nearly drowning in the sea) and correspond with feelings of fear, humiliation, intimidation, vulnerability, and a desire to escape the situation to preserve one's physical integrity (Hackmann et al., 2009).

Individuals who have panic attacks are thought to become conditioned to the unpleasant physical sensations that occur during a panic attack (Goldstein & Chambless, 1978), and such conditioning can occur even in the absence of negative cognitions (Bouton, Mineka, & Barlow, 2001). Individuals who have panic attacks tend to quickly recall autobiographical memories after panic-related cues (Wenzel & Cochran, 2006), and panic memories are typically vivid, are emotionally intense, and are perceived as reflecting an accurate portrayal of the negative event (e.g., O'Toole, Watson, Rosenberg, & Berntsen, 2016). Some individuals even reproduce panic symptoms when imaging events that have triggered panic in past (Ottaviani & Beck, 1987). Prioritized access to memories linked to beliefs related to panic may perpetuate the idea that an individual cannot cope with the occurrence of a panic attack or associated negative consequences. Furthermore, access to such memories can impede patients from understanding the realistic likelihood and consequences of an attack and maintain their heightened focus on bodily sensations and attention to threat, which in turn can enhance the likelihood that a panic attack will actually occur.

Fear of Having or Contracting an Illness

Autobiographical memories related to illness may help to maintain fear of having or contracting an illness, as in individuals with health anxiety. These individuals often report intrusive imagery when feeling anxious about their health, with images typically relating to anticipation of a future illness episode, including being told that they have contracted a life-threatening illness, suffering and dying from a life-threatening illness, or the impact of a life-threatening illness on loved ones (Muse et al., 2010). Readily accessible future imaginings that are maintained by the autobiographical memory system, including memories of past health-related experiences, may increase the individual's perception that a health problem is more likely to occur (overestimating threat) and in turn, increase the tendency for health care seeking behavior, reassurance seeking, and/or avoidance. Recurrent memories that encompass illness-relevant self-beliefs also perpetuate goals of illness avoidance, and represent states to be avoided (e.g., "if I am ill, it means I am worthless"). Goal-directed

behavior related to avoiding illness can also be maintained via memories of successful health care and reassurance seeking.

Fear of Traumatic Memories and Posttraumatic Sequelae

PTSD presents an interesting case for autobiographical memory bias, in which a hallmark symptom of PTSD is the involuntary but intrusive recollection of the traumatic experience, often in the form of mental images. The memories are so vivid, emotional, and sensory laden that the individuals experiencing them report feeling as if they are back in the traumatic situation (Brewin, Dalgleish, & Joseph, 1996). On the other hand, however, some individuals may struggle to retrieve details of the event voluntarily and in a coherent manner, though this is not the case for all individuals (e.g., Rubin, 2011).

Although the experience of flashbacks suggests that some representation of the traumatic event has been encoded and stored in memory, the inability to recall particular details suggests that the memories may not always be fully accessible. It is possible that involuntary reexperiencing of the traumatic event consists primarily of sensory impressions and physiological sensations, which are more accessible and directly activated in response to fear stimuli (Ehlers & Clark, 2000). Intrusive memories often represent stimuli that during the course of events predicted the onset of the trauma or signaled the onset of moments when the meaning became more traumatic and serve as warning signals (e.g., stimuli that if encountered again, would indicate impending danger and future threat; see Hackmann, Ehlers, Speckens, & Clark, 2004).

In terms of voluntary retrieval of autobiographical memories, individuals diagnosed with PTSD or acute stress disorder may demonstrate difficulty retrieving specific episodic memories (i.e., overgeneral memory bias), show deficiencies in retrieving positive autobiographical memories, and typically retrieve more trauma-related memories and episodic content relative to individuals who experience trauma and do not develop PTSD (see Moore & Zoellner, 2007). Deficits in the specific retrieval of past experiences can contribute to the maintenance of fear, avoidance, and negative outlook and substantiate trauma-focused self-representations.

The mnemonic representations of how the person behaved during and after the trauma, his or her appraisals of the trauma, and the presence of PTSD symptoms can also work to bias the voluntary recall of trauma memories. Ehlers and Clark (2000) reported the case of an individual who believed her trauma showed that nobody cared about her and recalled unfriendly responses of nurses in hospital, but did not recall that several people had tried to help her after the accident. Such selective retrieval prevents individuals from remembering aspects of the traumatic event that contradict their appraisals and thus prevents change in the appraisals. On the other hand, inability to remember all of the details of the trauma can be appraised by individuals in a way that maintains the sense of current threat; Ehlers and Clark (2000) described that some individuals concluded that flashbacks of the event or an inability to access all of the details of their memory meant something was seriously wrong

with them (e.g., brain damage, insanity, losing control). An inability to remember the exact nature or order of events can contribute to the erroneous appraisal of being responsible for the event or the incorrect conclusion that something even worse must have happened during the trauma.

Fear of Uncertain or Negative Outcomes

Biases in autobiographical memory may also be clinically relevant to pathological worry associated with fear of uncertainty. To this end, individuals with generalized anxiety disorder (GAD)—and OCD in some cases—present with broad worry domains, making it seem unlikely that a single, pivotal episodic autobiographical memory stands out as a stimulus for their fear (unlike intrusive imagery seen in other anxiety disorders). On the other hand, there is also evidence suggesting that they exhibit prioritized access to anxious negative memories (Burke & Mathews, 1992). These memories might contribute to their elaborative worry process and provide biased building blocks for future prospection, which can then facilitate the unrealistic apprehension of "disastrous" future events, which lead to more worry. Moreover, the propensity to recall negative past events more efficiently may promote a sense of danger in the world in general, contributing to insecurity and intolerance of uncertainty.

Autobiographical memory processes implicated in imagining the future may also perpetuate the worry process in individuals with GAD. Although these individuals do not report intrusive imagery associated with their fears, they do demonstrate a looming cognitive style that is characterized by broad and pervasive generation of mental scenarios that stereotypically represent potential threats as rapidly unfolding and rising in risk (Riskind & Williams, 2005). Borkovec, Alcaine, and Behar (2004) suggested that worry is a cognitive avoidance strategy that prevents imagining, coping with, and problem-solving around negative future events. The inability to vividly imagine future scenarios may hinder their ability to take concrete steps to resolve the worry (Jing, Madore, & Schacter, 2016), which then perpetuates future worry. Moreover, pathologically rehearsing either past or future scenarios can deepen associative memory networks, which increases the likelihood of drawing upon negative past and future scenarios when anxiety is activated.

CONCLUSION

Previous work has shown that recurrent memories and intrusive images of personal negative experiences can play a key role in the persistence of clinical fear and anxiety (e.g., Harvey, Watkins, Mansell, & Shafran, 2004). Drawing from theoretical and applied research in cognitive science, this chapter demonstrated that autobiographical memory biases may extend to the encoding and storage of particular episodic event details, the appraisal and impact of negative autobiographical memories, the prospection of future events, and the extraction of negative schematic meaning from environmental or internal

cues that are perceived as threatening. A major implication of biased auto-biographical memory is that it can perpetuate negative and distorted self-representations, which are often paramount across fear and anxiety disorders. Although distinct from other cognitive processes, such as attention bias (see Chapter 12) and interpretation bias (see Chapter 20), autobiographical memory bias is nevertheless related to the constellation of automatic fear- and anxiety-related cognitive events. The importance of autobiographical memory bias as a transdiagnostic maintenance process is also highlighted by the success of established and emerging treatment approaches (e.g., imaginal exposure, imagery rescripting), which are designed to target, modify, and/or retrain emotional memories and associated memory processes in fear and anxiety disorders.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Anderson, B., Goldin, P. R., Kurita, K., & Gross, J. J. (2008). Self-representation in social anxiety disorder: Linguistic analysis of autobiographical narratives. *Behaviour Research and Therapy*, *46*, 1119–1125. http://dx.doi.org/10.1016/j.brat.2008.07.001

Beck, A., Emery, G., & Greenberg, R. (2005). *Anxiety disorders and phobias: A cognitive perspective* (15th ed.). Cambridge, MA: Basic Books.

Berntsen, D. (2012). Spontaneous recollections: Involuntary autobiographical memories are a basic mode of remembering. In D. Berntsen & D. C. Rubin (Eds.), *Understanding autobiographical memory: Theories and approaches* (pp. 290–310). Cambridge, England: Cambridge University Press. http://dx.doi.org/10.1017/CBO9781139021937.021

Berntsen, D., & Rubin, D. C. (2006). The centrality of event scale: A measure of integrating a trauma into one's identity and its relation to posttraumatic stress disorder symptoms. *Behaviour Research and Therapy*, *44*, 219–231. http://dx.doi.org/10.1016/j.brat.2005.01.009

Borkovec, T. D., Alcaine, O. M., & Behar, E. (2004). Avoidance theory of worry and generalized anxiety disorder. In R. Heimberg, C. Turk, & D. Mennin (Eds.), *Generalized anxiety disorder: Advances in research and practice* (pp. 77–108). New York, NY: Guilford Press.

Bouton, M. E., Mineka, S., & Barlow, D. H. (2001). A modern learning theory perspective on the etiology of panic disorder. *Psychological Review*, *108*, 4–32. http://dx.doi.org/10.1037/0033-295X.108.1.4

Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological Review*, *103*, 670–686. http://dx.doi.org/10.1037/0033-295X.103.4.670

Brewin, C. R., Gregory, J. D., Lipton, M., & Burgess, N. (2010). Intrusive images in psychological disorders: Characteristics, neural mechanisms, and treatment implications. *Psychological Review*, *117*, 210–232. http://dx.doi.org/10.1037/a0018113

Brown, A. D., Root, J. C., Romano, T. A., Chang, L. J., Bryant, R. A., & Hirst, W. (2013). Overgeneralized autobiographical memory and future thinking in combat veterans with posttraumatic stress disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, *44*, 129–134. http://dx.doi.org/10.1016/j.jbtep.2011.11.004

Burke, M., & Mathews, A. (1992). Autobiographical memory and clinical anxiety. *Cognition and Emotion*, *6*, 23–35. http://dx.doi.org/10.1080/02699939208411056

Çili, S., & Stopa, L. (2015). Intrusive mental imagery in psychological disorders: Is the self the key to understanding maintenance? *Frontiers in Psychiatry*, *6*, 103. http://dx.doi.org/10.3389/fpsyt.2015.00103

Clark, D. A., & Beck, A. T. (2010). *Cognitive therapy of anxiety disorders: Science and practice*. New York, NY: Guilford Press.

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.), *Social phobia: Diagnosis, assessment and treatment* (pp. 69–93). New York, NY: Guilford Press.

Conway, M. A. (2005). Memory and the self. *Journal of Memory and Language*, *53*, 594–628. http://dx.doi.org/10.1016/j.jml.2005.08.005

Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review*, *107*, 261–288. http://dx.doi.org/10.1037/0033-295X.107.2.261

Coughtrey, A. E., Shafran, R., Lee, M., & Rachman, S. J. (2012). It's the feeling inside my head: A qualitative analysis of mental contamination in obsessive-compulsive disorder. *Behavioural and Cognitive Psychotherapy*, *40*, 163–173. http://dx.doi.org/10.1017/S1352465811000658

D'Argembeau, A. (2012). Autobiographical memory and future thinking. In D. Berntsen & D. C. Rubin (Eds.), *Understanding autobiographical memory: Theories and approaches* (pp. 311–330). Cambridge, England: Cambridge University Press. http://dx.doi.org/10.1017/CBO9781139021937.022

de Silva, P. (1986). Obsessional-compulsive imagery. *Behaviour Research and Therapy*, *24*, 333–350. http://dx.doi.org/10.1016/0005-7967(86)90193-2

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, *38*, 319–345. http://dx.doi.org/10.1016/S0005-7967(99)00123-0

Erwin, B. A., Heimberg, R. G., Marx, B. P., & Franklin, M. E. (2006). Traumatic and socially stressful life events among persons with social anxiety disorder. *Journal of Anxiety Disorders*, *20*, 896–914. http://dx.doi.org/10.1016/j.janxdis.2005.05.006

Fairbrother, N., & Rachman, S. (2004). Feelings of mental pollution subsequent to sexual assault. *Behaviour Research and Therapy*, *42*, 173–189. http://dx.doi.org/10.1016/S0005-7967(03)00108-6

Fitzgerald, J. M. (1992). Autobiographical memory and conceptualizations of the self. In M. A. Conway, D. C. Rubin, H. Spinnler, & W. A. Wagenaar (Eds.), *Theoretical perspectives on autobiographical memory* (pp. 99–114). Dordrecht, the Netherlands: Springer. http://dx.doi.org/10.1007/978-94-015-7967-4_6

Foa, E. B., Huppert, J. D., & Cahill, S. P. (2006). Emotional processing theory: An update. In B. O. Rothbaum (Ed.), *The nature and treatment of pathological anxiety* (pp. 3–24). New York, NY: Guilford Press.

Foa, E. B., & Jaycox, L. H. (1999). Cognitive-behavioral theory and treatment of posttraumatic stress disorder. In I. D. Spiegel (Ed.), *Efficacy and cost-effectiveness of psychotherapy* (pp. 23–61). Washington, DC: American Psychiatric Association.

Goldstein, A. J., & Chambless, D. L. (1978). A reanalysis of agoraphobia. *Behavior Therapy*, *9*, 47–59. http://dx.doi.org/10.1016/S0005-7894(78)80053-7

Hackmann, A., Day, S., & Holmes, E. A. (2009). Agoraphobia: Imagery and the threatened self. In L. Stopa (Ed.), *Imagery and the threatened self: Perspectives on mental imagery and the self in cognitive therapy* (pp. 112–136). London, England: Routledge.

Hackmann, A., Ehlers, A., Speckens, A., & Clark, D. M. (2004). Characteristics and content of intrusive memories in PTSD and their changes with treatment. *Journal of Traumatic Stress*, *17*, 231–240. http://dx.doi.org/10.1023/B:JOTS.0000029266.88369.fd

Harvey, A. G., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive behavioural processes across psychological disorders*. Oxford, England: Oxford University Press. http://dx.doi.org/10.1093/med:psych/9780198528883.001.0001

Hertel, P. T., Brozovich, F., Joormann, J., & Gotlib, I. H. (2008). Biases in interpretation and memory in generalized social phobia. *Journal of Abnormal Psychology*, *117*, 278–288. http://dx.doi.org/10.1037/0021-843X.117.2.278

Holland, A. C., & Kensinger, E. A. (2010). Emotion and autobiographical memory. *Physics of Life Reviews*, 7, 88–131. http://dx.doi.org/10.1016/j.plrev.2010.01.006

Holmes, E. A., & Mathews, A. (2010). Mental imagery in emotion and emotional disorders. *Clinical Psychology Review*, *30*, 349–362. http://dx.doi.org/10.1016/j.cpr.2010.01.001

Horowitz, M. J. (1970). *Image formation and cognition*. New York, NY: Appleton-Century Crofts.

Jing, H. G., Madore, K. P., & Schacter, D. L. (2016). Worrying about the future: An episodic specificity induction impacts problem solving, reappraisal, and well-being. *Journal of Experimental Psychology: General*, *145*, 402–418. http://dx.doi.org/10.1037/xge0000142

Johnson, M. K., Foley, M. A., Suengas, A. G., & Raye, C. L. (1988). Phenomenal characteristics of memories for perceived and imagined autobiographical events. *Journal of Experimental Psychology: General*, *117*, 371–376. http://dx.doi.org/10.1037/0096-3445.117.4.371

Kosslyn, S. M., Ganis, G., & Thompson, W. L. (2001). Neural foundations of imagery. *Nature Reviews Neuroscience*, *2*, 635–642. http://dx.doi.org/10.1038/35090055

Krans, J., de Bree, J., & Bryant, R. A. (2014). Autobiographical memory bias in social anxiety. *Memory*, *22*, 890–897. http://dx.doi.org/10.1080/09658211.2013.844261

LaBar, K. S. (2007). Beyond fear: Emotional memory mechanisms in the human brain. *Current Directions in Psychological Science*, *16*, 173–177. http://dx.doi.org/10.1111/j.1467-8721.2007.00498.x

McGaugh, J. L. (2004). The amygdala modulates the consolidation of memories of emotionally arousing experiences. *Annual Review of Neuroscience*, *27*, 1–28. http://dx.doi.org/10.1146/annurev.neuro.27.070203.144157

Moore, S. A., & Zoellner, L. A. (2007). Overgeneral autobiographical memory and traumatic events: An evaluative review. *Psychological Bulletin*, *133*, 419–437. http://dx.doi.org/10.1037/0033-2909.133.3.419

Morgan, J. (2010). Autobiographical memory biases in social anxiety. *Clinical Psychology Review, 30,* 288–297. http://dx.doi.org/10.1016/j.cpr.2009.12.003

Moscovitch, D. A., Gavric, D. L., Merrifield, C., Bielak, T., & Moscovitch, M. (2011). Retrieval properties of negative vs. positive mental images and autobiographical memories in social anxiety: Outcomes with a new measure. *Behaviour Research and Therapy*, *49*, 505–517. http://dx.doi.org/10.1016/j.brat.2011.05.009

Moscovitch, D. A., Vidovic, V., Lenton-Brym, A. P., Dupasquier, J. R., Barber, K. C., Hudd, T., . . . Romano, M. (2018). Autobiographical memory retrieval and appraisal in social anxiety disorder. *Behaviour Research and Therapy*, *107*, 106–116. http://dx.doi.org/10.1016/j.brat.2018.06.008

Moscovitch, M. (2008). The hippocampus as a "stupid," domain-specific module: Implications for theories of recent and remote memory, and of imagination. *Canadian Journal of Experimental Psychology/Revue Canadienne de Psychologie Expérimentale*, *62*, 62–79. http://dx.doi.org/10.1037/1196-1961.62.1.62

Moscovitch, M. (2012). The contribution of research on autobiographical memory to past and present theories of memory consolidation. In R. Bernsten & D. C. Rubin (Eds.), *Understanding autobiographical memory: Theories and approaches* (pp. 91–113). Cambridge, England: Cambridge University Press. http://dx.doi.org/10.1017/CBO9781139021937.009

Moscovitch, M., Cabeza, R., Winocur, G., & Nadel, L. (2016). Episodic memory and beyond: The hippocampus and neocortex in transformation. *Annual Review of Psychology*, *67*, 105–134. http://dx.doi.org/10.1146/annurev-psych-113011-143733

Muse, K., McManus, F., Hackmann, A., Williams, M., & Williams, M. (2010). Intrusive imagery in severe health anxiety: Prevalence, nature and links with memories and maintenance cycles. *Behaviour Research and Therapy*, *48*, 792–798. http://dx.doi.org/10.1016/j.brat.2010.05.008

Osman, S., Cooper, M., Hackmann, A., & Veale, D. (2004). Spontaneously occurring images and early memories in people with body dysmorphic disorder. *Memory*, *12*, 428–436. http://dx.doi.org/10.1080/09658210444000043

O'Toole, M. S., Watson, L. A., Rosenberg, N. K., & Berntsen, D. (2016). Negative autobiographical memories in social anxiety disorder: A comparison with panic disorder and healthy controls. *Journal of Behavior Therapy and Experimental Psychiatry*, *50*, 223–230. http://dx.doi.org/10.1016/j.jbtep.2015.09.008

Ottaviani, R., & Beck, A. T. (1987). Cognitive aspects of panic disorders. *Journal of Anxiety Disorders*, *1*, 15–28. http://dx.doi.org/10.1016/0887-6185(87)90019-3

Price, K., Veale, D., & Brewin, C. R. (2012). Intrusive imagery in people with a specific phobia of vomiting. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*, 672–678. http://dx.doi.org/10.1016/j.jbtep.2011.09.007

Rachman, S. (2007). Unwanted intrusive images in obsessive compulsive disorders. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*, 402–410. http://dx.doi.org/10.1016/j.jbtep.2007.10.008

Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy*, *35*, 741–756. http://dx.doi.org/10.1016/S0005-7967(97)00022-3

Reimer, S. G., & Moscovitch, D. A. (2015). The impact of imagery rescripting on memory appraisals and core beliefs in social anxiety disorder. *Behaviour Research and Therapy*, *75*, 48–59. http://dx.doi.org/10.1016/j.brat.2015.10.007

Riskind, J. H., & Williams, N. L. (2005). The looming cognitive style and generalized anxiety disorder: Distinctive danger schemas and cognitive phenomenology. *Cognitive Therapy and Research*, *29*, 7–27. http://dx.doi.org/10.1007/s10608-005-1645-z

Rubin, D. C. (2011). The coherence of memories for trauma: Evidence from posttraumatic stress disorder. *Consciousness and Cognition: An International Journal*, *20*, 857–865. http://dx.doi.org/10.1016/j.concog.2010.03.018

Salkovskis, P. M. (1989). Cognitive-behavioural factors and the persistence of intrusive thoughts in obsessional problems. *Behaviour Research and Therapy*, *27*, 677–682. http://dx.doi.org/10.1016/0005-7967(89)90152-6

Sansom-Daly, U. M., Bryant, R. A., Cohn, R. J., & Wakefield, C. E. (2014). Imagining the future in health anxiety: The impact of rumination on the specificity of illness-related memory and future thinking. *Anxiety, Stress, & Coping: An International Journal*, *27*, 587–600. http://dx.doi.org/10.1080/10615806.2014.880111

Schacter, D. L. (2001). *The seven sins of memory: How the mind forgets and remembers*. Boston, MA: Houghton Mifflin.

Schacter, D. L., Addis, D. R., Hassabis, D., Martin, V. C., Spreng, R. N., & Szpunar, K. K. (2012). The future of memory: Remembering, imagining, and the brain. *Neuron*, *76*, 677–694. http://dx.doi.org/10.1016/j.neuron.2012.11.001

Singer, J. A., & Salovey, P. (1993). *The remembered self: Emotion and memory in personality*. New York, NY: Free Press.

Speckens, A. E. M., Hackmann, A., Ehlers, A., & Cuthbert, B. (2007). Imagery special issue: Intrusive images and memories of earlier adverse events in patients with obsessive-compulsive disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*, 411–422. http://dx.doi.org/10.1016/j.jbtep.2007.09.004

Stopa, L. (Ed.). (2009). *Imagery and the threatened self: Perspectives on mental imagery and the self in cognitive therapy*. New York, NY: Routledge. http://dx.doi.org/10.4324/9780203878644

Sutherland, K., & Bryant, R. A. (2005). Self-defining memories in posttraumatic stress disorder. *British Journal of Clinical Psychology*, *44*, 591–598. http://dx.doi.org/10.1348/014466505X64081

Talmi, D. (2013). Enhanced emotional memory: Cognitive and neural mechanisms. *Current Directions in Psychological Science*, *22*, 430–436. http://dx.doi.org/10.1177/0963721413498893

Thomsen, D. K., & Brinkmann, S. (2009). An interviewer's guide to autobiographical memory: Ways to elicit concrete experiences and to avoid pitfalls in interpreting them. *Qualitative Research in Psychology*, *6*, 294–312. http://dx.doi.org/10.1080/14780880802396806

Tulving, E. (1985). Memory and consciousness. *Canadian Psychology/Psychologie Canadienne*, *26*, 1–12. http://dx.doi.org/10.1037/h0080017

Veale, D. (2004). Advances in a cognitive behavioural model of body dysmorphic disorder. *Body Image*, *1*, 113–125. http://dx.doi.org/10.1016/S1740-1445(03)00009-3

Veale, D. (2009). Cognitive behaviour therapy for a specific phobia of vomiting. *The Cognitive Behaviour Therapist*, *2*, 272–288. http://dx.doi.org/10.1017/S1754470X09990080

Wenzel, A., & Cochran, C. K. (2006). Autobiographical memories prompted by automatic thoughts in panic disorder and social phobia. *Cognitive Behaviour Therapy*, *35*, 129–137. http://dx.doi.org/10.1080/16506070600583130

Williams, J. M. G., Barnhofer, T., Crane, C., Herman, D., Raes, F., Watkins, E., & Dalgleish, T. (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin*, *133*, 122–148. http://dx.doi.org/10.1037/0033-2909.133.1.122

Witheridge, K. S., Cabral, C. M., & Rector, N. A. (2010). Examining autobiographical memory content in patients with depression and anxiety disorders. *Cognitive Behaviour Therapy*, *39*, 302–310. http://dx.doi.org/10.1080/16506073.2010.520730

Zlomuzica, A., Dere, D., Machulska, A., Adolph, D., Dere, E., & Margraf, J. (2014). Episodic memories in anxiety disorders: Clinical implications. *Frontiers in Behavioral Neuroscience*, *8*, 131. http://dx.doi.org/10.3389/fnbeh.2014.00131

12

Attention Bias

Omer Azriel and Yair Bar-Haim

Imagine two scenarios. In the first, Arun is hiking through the forest when she spots a rattlesnake several yards ahead on the trail.[1] Arun's attention prioritizes processing the snake over nearly all other aspects of the environment. Focusing on the snake and allocating resources for dealing with its presence is adaptive and paramount for her survival. Now, imagine a second scenario: Arun is hiking in the same forest when she spots a tree branch several yards ahead on the ground. The branch grabs her attention briefly, but her attention system gives it low priority for further processing; perhaps at a level that fails to reach consciousness. She continues hiking, ignoring the branch altogether. An adaptive function of her attention system has facilitated detection and further processing of threats and allowed her to filter and ignore less relevant stimuli. Note, however, that a rattlesnake and a branch reflect extremes that are rather easily distinguished in relation to threat. Almost anyone would allocate extensive attentional resources to the former and ignore the latter.

Attention bias is the tendency to prioritize the processing of certain types of stimuli over others. At any given moment, an individual's senses can perceive countless stimuli in the immediate surroundings. Initially, multiple messages that reach the senses are processed in parallel. However, because of the limited capacity of the human mind, further detailed processing is possible only for a

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[1]All clinical case material has been altered to protect patient confidentiality.

select subset of stimuli. To reduce the load, a selective filter blocks irrelevant messages before they reach the processing bottleneck and allows only a limited number of signals to be more thoroughly processed and used in the control of behavior. Attention is at the core of these filtering and prioritization processes (Broadbent, 1958; Duncan, 1980; Treisman, 1969). While attention biases reflect an ongoing cognitive adaptation associated with the processing of all aspects of the environment, paying specific attention to potential threats is a priority for survival and therefore, a primary function of the attention system. This chapter focuses on *threat-related attention bias*—the tendency to prioritize the processing of potential threats over benign stimuli—and its relation to anxiety.

Figure 12.1 shows the individual differences in threat-related attention, especially when the processed stimulus is ambiguous. What if Arun had spotted a gecko rather than a snake, encountered a snake locked in a vivarium, saw a photograph of a snake, or simply read the word *snake*? Would her attention system prioritize these stimuli over other more neutral ones? There is ample evidence to suggest that the human brain still selectively processes and prioritizes such low-risk stimuli (e.g., Dijksterhuis & Aarts, 2003; Fox et al., 2000; Hansen & Hansen, 1988; Öhman, Flykt, & Esteves, 2001). It is with such stimuli, however, where individual differences emerge; some people consistently display a threat-related attention bias (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007; Mogg & Bradley, 1998). Individuals

FIGURE 12.1. Individual Differences in Attentional Prioritization Are Typically Revealed in Relation to Minor Threats
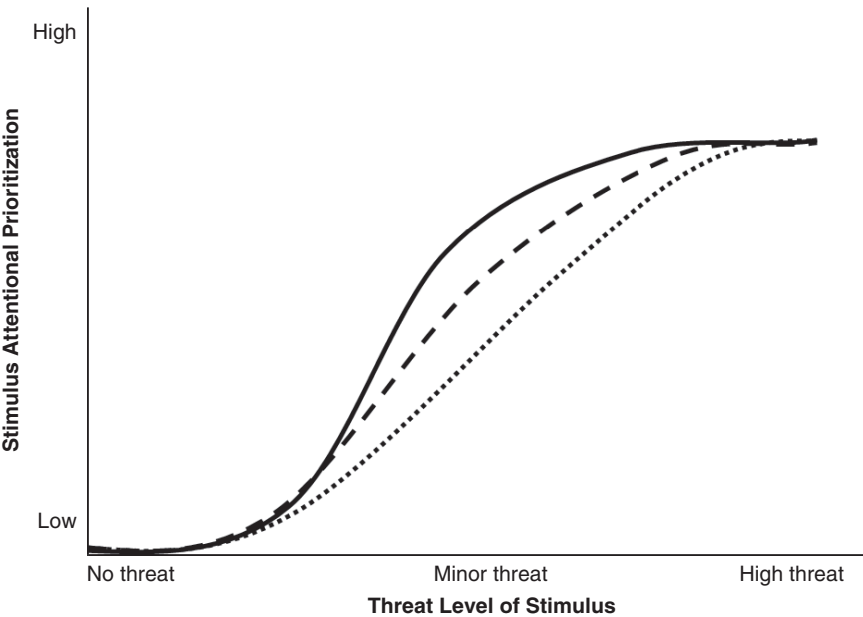
The solid line depicts a person who would prioritize mild threats more readily compared with a typical person (depicted with the dashed line). The dotted line depicts no threat prioritization.

prone to threat-related attention bias have their attention more frequently and more intensely captured by minor threats and find it difficult to disengage from such stimuli (Cisler & Koster, 2010; Fox, Russo, Bowles, & Dutton, 2001; Richards, Benson, Donnelly, & Hadwin, 2014; Yiend, 2010). Extensive research indicates that threat-related attention bias plays a significant role in the development and maintenance of clinical anxiety, which is discussed next.

CONCEPTUAL IMPLICATIONS

Attention Bias and Anxiety

Once a stimulus is appraised as threatening, it takes on negative emotional significance and becomes a mental priority. This is an automatic part of the body's innate danger detection system—the fight-or-flight response—that is activated whenever a threat is perceived (Beck & Clark, 1997; Davis & Whalen, 2001; LeDoux, 2009). By scanning the surroundings and being hypervigilant for danger cues, this mechanism helps individuals determine how to protect themselves in the event that danger is present. Although this is often an involuntary process, some individuals adopt a more deliberate anticipatory strategy of hypervigilance and scanning if they believe such tactics are necessary to avoid perceived threat. As a result of this attention bias toward threat, these individuals become exquisitely sensitive to threat-relevant stimuli, even those that pose little danger. Thus, attention bias maintains anxiety by fostering an enhanced perception of the world as dangerous (Eysenck, 1992), which in turn intensifies threat-related attention bias (Eldar, Ricon, & Bar-Haim, 2008; Eysenck, 1997; Mathews & MacLeod, 2002).

Numerous studies indicate that individuals with anxiety across a wide range of clinical and subclinical categories exhibit attention bias toward threatening information (Armstrong & Olatunji, 2012; Bar-Haim et al., 2007; Van Bockstaele et al., 2014). Attention bias is typically stronger for disorder-congruent stimuli relative to more general threats. Pictures of snakes or words related to snakes elicit greater attention bias compared with other negative stimuli among individuals with snake phobia (Wikström, Lundh, Westerlund, & Högman, 2004); whereas individuals with social anxiety are more likely to exhibit attention bias when facing words related to social fears relative to general threat words (e.g., Becker, Rinck, Margraf, & Roth, 2001; for a review and meta-analysis, see Pergamin-Hight, Naim, Bakermans-Kranenburg, van IJzendoorn, & Bar-Haim, 2015). Similarly, individuals with health anxiety and panic attacks, who are afraid of certain bodily sensations, fearing that they indicate the presence of a serious medical condition (e.g., heart attack, cardiac disease, cancer), preferentially attend to even slight fluctuations and perturbations in these internal stimuli (e.g., Asmundson, Sandler, Wilson, & Walker, 1992). Finally, individuals with obsessional problems display attention bias toward idiosyncratic stimuli that cue obsessional fear and compulsive rituals (Foa, Ilai, McCarthy, Shoyer, & Murdock, 1993).

Etiology and Developmental Aspects

Whether threat-related attention bias is innate, acquired, or both is unknown. Threat-related attention bias is observed among children as young as 5 years old (Pérez-Edgar et al., 2011; White, Degnan, et al., 2017). This suggests that early environmental or biological factors are involved in the formation of threat-related attentional patterns. For example, various studies indicate that allele variants of the serotonin transporter gene (*5-HTTLPR*), known to modulate synaptic efficacy of serotonin reuptake, is associated with selective attention to threat. Carriers of the low serotonin transmission genotype tend to display an enhanced attentional threat bias relative to carriers of the intermediate and high efficacy genotypes (for a review and meta-analysis, see Pergamin-Hight, Bakermans-Kranenburg, van IJzendoorn, & Bar-Haim, 2012). Although correlational, such evidence suggests a genetic influence on threat-related attention deployment with some individuals receiving a slight push from nature to overattend to minor threats.

Whether innate, acquired, or reflecting transactions among both, elevated attention bias to threats early in life has the potential to shape a hostile perception of the environment and has a long-term effect on emotional development in children. Some children exhibit an early tendency for behavioral inhibition—a temperament characterized by anxious behaviors, heightened sensitivity to novelty, and social withdrawal. These children tend to exhibit anxious behaviors at later ages as well and are at increased risk for developing anxiety disorders (Biederman et al., 1993, 2001; Chronis-Tuscano et al., 2009). Attention bias to threats moderates this association, increasing the risk of young children with early behavioral inhibition to exhibit anxiety-related behaviors at later childhood and adolescence (Pérez-Edgar et al., 2010, 2011; White, Degnan, et al., 2017). Threat-related attention bias is likely to contribute to long-term maintenance and aggravation of anxiety in predisposed children by coloring their environments in danger and threat shades (for further discussion see Pine, Helfinstein, Bar-Haim, Nelson, & Fox, 2009; White, Degnan, et al., 2017).

ASSESSMENT

Unlike most concepts in psychopathology, which can be assessed using patient self-report and clinical interview methods, the measurement of attention bias in the context of anxiety relies heavily on adaptations form experimental research and typically uses computerized cognitive tasks. Two types of paradigms exist: those relying on measures of reaction time (RT) and those applying eye-tacking paradigms. RT tasks infer attention bias from differences in the amount of time required for an individual to respond to different types of stimuli (e.g., threat vs. neutral). Such tasks have been used extensively in research but are not widely used in clinical settings. They are also limited in that (a) they capture only indirect and static effects of attention on behavior,

and (b) derived bias scores have poor psychometric properties (e.g., Evans & Britton, 2018; McNally, 2019; Price et al., 2015). Eye-tracking tasks, on the other hand, capture more direct effects of, and provide continuous access to, dynamic changes in attention. Some of these tasks also possess good psychometric properties (e.g., Lazarov, Abend, & Bar-Haim, 2016; Lazarov, Ben-Zion, Shamai, Pine, & Bar-Haim, 2018). Some of the typical tasks applied to measure threat-related attention bias are described next.

Reaction Time-Based Measures

Emotional Stroop Task

The emotional Stroop task is a modified version of the classic color-naming Stroop task (Stroop, 1935). In this task, either a colored neutral word (e.g., *data*, written in blue [but shown in bold in Figure 12.2a]) or a colored threat-related word (e.g., *dead*, written in green [but shown in italics in Figure 12.2a]) are sequentially presented. Participants are asked to indicate as quickly as possible the color in which each word is written. Threat-related attention bias is determined by comparing the difference between mean RT with color-name threat words and mean RT with color-name neutral words. This relation is thought to represent the extent to which threat stimuli capture attention and interfere with the otherwise emotionally neutral color-naming task. Variants of the emotional Stroop task use schematic or real faces displaying threat and neutral expressions of emotion (e.g., Kolassa & Miltner, 2006; Putman, Hermans, & van Honk, 2004). In such variants, individuals are instructed to color-name the background on which the face is superimposed or the color in which the schematic face is drawn. Applying faces rather than words as stimuli can be useful when studying populations with differing levels of reading comprehension (e.g., children, individuals with reading disabilities, nonnative readers).

Dot-Probe Task

In the dot-probe task (MacLeod, Mathews, & Tata, 1986), neutral and threat-related stimuli are presented simultaneously, creating a spatial rivalry for an individual's attention. In each trial, threat–neutral pairs are presented for a brief time followed by a probe (e.g., an *x*) appearing on the screen at either the location of the neutral or the threat-related stimulus (see Figure 12.2b). The individual is asked to respond as quickly and accurately as possible to the probe, either identifying its location or discriminating its variant (e.g., if the probe is an arrowhead, the patient should indicate its direction). Attention bias is calculated as the relation between the mean RT of trials in which the probe was presented at the location of a threat-related stimulus (i.e., threat congruent trials) and the mean RT of trials in which the probe was presented at the location of a neutral stimulus (i.e., threat incongruent trials). When RTs are consistently faster for trials in which the probe appears at the location of the threat-relevant stimulus, it is thought to reflect an attention bias toward

**FIGURE 12.2. Examples of Typical Trials in Different Attention Bias
Assessment Methods**

A. The emotional Stroop task
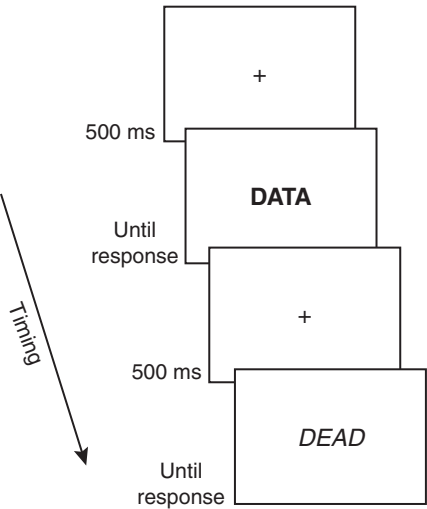
B. The dot probe task
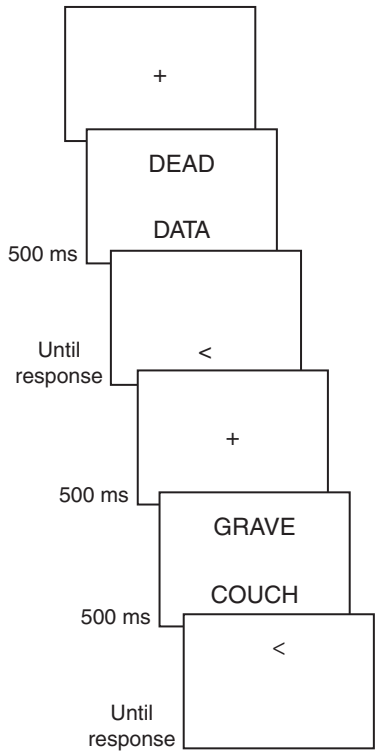
C. The emotional spatial cuing task
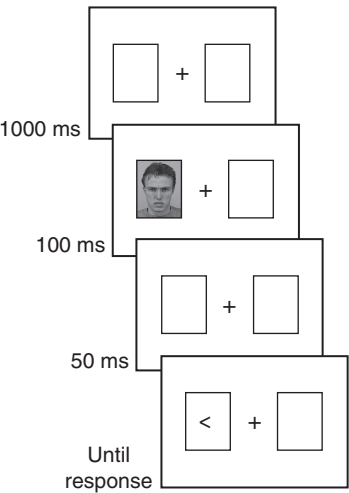
(A) The emotional Stroop task: A trial with a neutral stimulus followed by a trial with a threat stimulus.
Participants are asked to name the text color as fast as possible. (B) The dot-probe task: A trial with
a target appearing at the neutral stimulus location followed by a trial with a target appearing at the
threat stimulus location. Participants are asked to indicate the arrowhead's direction as fast as
possible. (C) The emotional spatial cueing task: valid-cue trial with a threatening stimulus. Participants
are asked to indicate the arrowhead's direction as fast as possible.

FIGURE 12.2. *(Continued)*

D. Visual search task

Until response

Until response

E. Free viewing task

6000 ms

(D) A visual search task. Participants are asked to detect the angry face within the faces array (top panel). All neutral faces array; participants are asked to indicate whether the array contains an angry face or not (bottom panel). (E) A free viewing task: Participants are asked to freely watch an array with equally appearing disgusted and neutral faces. Images IDs: F01NE, F04DI, F04NE, F06DI, F07NE, F09NE, F12NE, F14NE, F19AN, F19DI, F21NE, F23DI, F27DI, F28NE, F29NE, F30DI, F32NE, M02DI, M07NE, M08AN, M11NE, M13NE, M14NE, M16NE, M17NE, M18NE, M21NE, M22NE, M23DI, M28NE, M29NE, M30NE, M34NE, M35NE. All faces images from *The Karolinska Directed Emotional Faces (KDEF)* [CD ROM], by E. Lundqvist, D. Flykt, and A. Öhman, 1998, Solna, Sweden: Karolinska Institutet. Copyright 1998 by Karolinska Institutet. Reprinted with permission.

threat. Meta-analyses indicate a medium size effect of the association between anxiety and attention bias as measured by the dot-probe task.

The task is easy to administer, takes about 5 to 10 minutes, and can apply words, faces, or any other relevant stimuli. Yet, it has important drawbacks. First, it has low internal consistency and test–retest reliability (e.g., Schmukle, 2005; Staugaard, 2009). Second, it cannot distinguish between specific sub-components of attention (i.e., one cannot determine whether faster responses to probes appearing at threat locations result from faster engagement with, or slower disengagement from threat stimuli). Koster, Crombez, Verschuere, and De Houwer (2004) suggested adding and computing mean RTs to trials consisting of two neutral stimuli. Faster engagement with threat could be indexed by faster responses to threat-congruent trials compared with neutral–neutral trials. Difficulty to disengage attention from threat could be indexed by slower responses to threat-incongruent trials compared with neutral–neutral trials.

Emotional Spatial Cuing Task

Based on Posner's (1980) spatial cuing paradigm, the emotional spatial cuing task (Fox et al., 2001) includes a brief presentation of either a neutral cue or a threat cue in each trial. Immediately after this presentation, the individual responds to a target that appears either at the spatially cued location (*valid-cue condition*; see Figure 12.2c) or at the alternative location (*invalid-cue condition*). The mean RT on valid-cue trials is subtracted from the mean RT on invalid-cue trials, with the difference indicating a general threat-related attention bias. The emotional spatial cueing task also affords a differentiation between biased attentional engagement and disengagement processes. Performance differences between threat and neutral trials in the valid-cue condition are thought to indicate a bias in initial orienting of attention or attentional engagement. Alternatively, differences in the invalid-cue condition reflect difficulty to disengage attention from threat-related stimuli.

Studies that have used the emotional spatial cueing task indicate an association between threat-related attention bias and anxiety, with effect sizes like those found in studies using the emotional Stroop and the dot-probe tasks (Bar-Haim et al., 2007). Threat-related attention bias in anxiety is also associated with difficulty disengaging attention from than with faster engagement with threat stimuli (e.g., Amir, Elias, Klumpp, & Przeworski, 2003; Fox et al., 2001). Importantly, the emotional spatial cuing task involves the presentation of a single stimulus in each trail, thus not modeling a direct competition between different stimuli on attention resources, arguably reflecting low ecological validity (Bar-Haim et al., 2007).

Visual Search Tasks

In visual search tasks (e.g., Öhman, Flykt, & Esteves, 2001; Rinck, Becker, Kellermann, & Roth, 2003), individuals are presented with arrays of words or images, and instructed to detect a specific target within each array (e.g., an angry face among eight neutral faces, a neutral face among eight angry faces;

see Figure 12.2d, top). Threat-related attention bias is inferred from faster detection of threat-relevant stimuli within an array of neutral stimuli as compared with the inverse. A variant of this task includes fully neutral arrays (e.g., eight neutral faces) and instructs the respondent to determine whether a threat-relevant stimulus (e.g., an angry face) appeared or not (see Figure 12.2d, bottom). Threat-related attention bias in such designs is calculated as the difference between the mean time taken to decide that no target appeared (*nontarget trials*) and the decision time in trials including an actual threat-related target. Visual search tasks are not widely used in research and have produced inconsistent results (e.g., Eastwood et al., 2005; Wieser, Hambach, & Weymar, 2018).

Eye-Tracking Measures

The most straightforward use of eye-tracking technology for the assessment of threat-related attention biases is through *free-viewing tasks*. These tasks present arrays comprising neutral and threat stimuli (see Figure 12.2e), and individuals observe these in any way they like as their gaze is tracked and recorded. Various indices of threat-related attention bias can then be extracted from the gaze data. Biased attentional orienting toward threat is typically indexed by more frequent and/or faster first fixations on threat stimuli relative to neutral stimuli. A more global measure of attention bias is the relative overall time the individual visually dwells on threat stimuli relative to neutral stimuli, with longer time spent on the former compared with the later indicating threat-related attention bias (for detailed reviews, see Armstrong & Olatunji, 2012; Richards et al., 2014). Total dwell time measures are typically more consistent and reliable than first fixation indices (Lazarov et al., 2016, 2018; Waechter, Nelson, Wright, Hyatt, & Oakman, 2014). A meta-analysis of eye-tracking studies indicates a significant association between anxiety and attention bias toward threat using these methods (Armstrong & Olatunji, 2012).

CLINICAL IMPLICATIONS

Most psychosocial interventions for anxiety target top-down conscious thought processes and rely heavily on helping individuals to think about their internal models of self, others, and the world; and consciously challenge and modify maladaptive thoughts and behaviors. However, although efficacious treatments for anxiety have been available for decades, current first-line interventions (e.g., cognitive behavior therapy [CBT], pharmacotherapy) have a 50% to 70% response plateau (Ballenger, 2004; Barlow, Gorman, Shear, & Woods, 2000; Hofmann & Smits, 2008; McEvoy, 2007), with high rates of relapse and low rates of remission. These observations have led to a call for interventions that increase patient access with automated computer-based procedures, reduce costs, and target novel mechanisms that are not accessible through traditional therapies (Mohr, Burns, Schueller, Clarke, &

Klinkman, 2013). Three decades of extensive research on threat-related attention biases provide viable therapeutic targets for answering this call.

Attention bias modification therapy (ABM; Bar-Haim, 2010; MacLeod & Clarke, 2015), is designed to directly target the mechanism of selective attention to threat in anxiety. ABM seeks to modify threat-related attention biases through computerized retraining exercises. The rationale behind ABM therapy is straightforward: If threat-related attention bias plays a causal role in promoting anxiety, then reduction of threat bias should lead to reduction of symptoms. This approach departs from traditional CBT as it relies on implicit training of a cognitive pattern as opposed to effortful induction of changes to thought and behavior.

The first generation of ABM therapies relied on modified RT-based attention bias measurement tasks. Although various ABM variants have been tested, the most robustly studied ABM therapy uses variants of the dot-probe task. Unlike the classic attention measurement task described previously, in which threat-neutral pairs are shown briefly on each trial and respondents are asked to discriminate a following probe that appears with equal probability at the location of threat and neutral stimuli (see Figure 12.2b), in ABM variants probe location is systematically manipulated to increase the proportion of probes appearing at the location of the neutral stimulus. It is assumed that because attending to such contingencies can assist in task performance, an implicitly learned bias away from threat is gradually being induced with repetition of many trials. Although large variability exists in the number of training trials delivered per ABM session, and in the number of sessions in an ABM treatment protocol, ABM therapy is usually brief. The most commonly applied protocol delivers 150 to 200 training repetitions per session (lasting about 10 minutes), in eight twice-weekly sessions. Meta-analyses of randomized controlled trials (RCTs) suggest a significant small-to-medium effect size for ABM therapy in anxiety disorders (Hakamata et al., 2010; Jones & Sharpe, 2017; Linetzky, Pergamin-Hight, Pine, & Bar-Haim, 2015; Lowther & Newman, 2014; Mogoaşe, David, & Koster, 2014).

ABM therapy has also been applied as an adjunct to CBT, with preliminary results from RCTs suggesting augmentation of overall treatment outcome (Lazarov, Marom, et al., 2017; Riemann et al., 2013; Shechner et al., 2014; White, Sequeira, et al., 2017; but see Rapee et al., 2013 for failed augmentation). Research on how ABM could most effectively be integrated into standard CBT or pharmacological therapies, however, is still in its early stages. One option is to apply ABM within standard CBT sessions (e.g., Lazarov, Marom, et al., 2017; Shechner et al., 2014). Alternatively, ABM could be offered as homework complementing standard CBT (Rapee et al., 2013). Finally, ABM could be applied as a separate module sequenced before standard CBT protocols with the hope of enhancing overall treatment gains. Although this latter approach still lacks evidence in formal RCTs, it is currently being tested in various trials. The driving hypothesis for such sequenced delivery (ABM before CBT) is based on the notion that if bottom-up threat-related attention biases could be attenuated before formal CBT begins, greater therapeutic

gains and lower dropout rates may be achieved as patients would engage less with threats at automatic-perceptual levels, therefore facilitating direct and effortful dealings with their fears in CBT.

Although the first generation of RT-based ABM therapies show promise and have been extensively studied, researchers and clinicians readily acknowledge that technological advances and better understanding of neurocognitive mechanisms could be harnessed for the development of even more potent and engaging ABM therapies. In many respects, one could think of dot-probe-based ABM as reflecting the very early stage of arcade video games that featured simple, monochromatic two-dimensional graphics—a far cry from the level of sophistication of current video games. Similarly, further developments with novel ABM procedures are likely in the coming years. One example of a second-generation eye-tracking-based protocol for social anxiety disorder, gaze contingent music reward therapy (GC-MRT), was recently tested in an RCT for patients with social anxiety disorder (Lazarov, Pine, & Bar-Haim, 2017).

In a GC-MRT session, the patient is asked to select a music track he or she would like to listen to during the session. The patient is then asked to observe matrices of faces comprising threat and neutral expressions (e.g., Figure 12.2e) while gaze position is continuously monitored. Importantly, the selected music is played only when the patient fixates on one of the neutral faces. The music halts when the patient looks at a threat face. Through this operant conditioning procedure, the patient's attentional threat bias is modified to favor neutral over threat facial expressions. It is expected that these induced changes in gaze pattern would generalize to real-life social situations and will eventually lead to meaningful reductions in social anxiety. Indeed, a preliminary RCT (Lazarov, Pine, & Bar-Haim, 2017) indicates that GC-MRT yielded greater reductions in social anxiety relative to a control condition on clinician-rated and self-reported measures, and that therapeutic effects were maintained at a 3-month follow-up. GC-MRT reduced dwell time on threat, which partially mediated the observed clinical effects. Relative to first generation ABMs, this novel ABM protocol appears to be more acceptable for patients, more potent in changing threat-related attention bias, and yields a large effect size.

CONCLUSION

Threat-related attention bias refers to the tendency to prioritize the processing of threats over benign or neutral stimuli. When an actual threat is present, this process is highly adaptive and important to survival. Yet, when an individual overattends to minor threats, this could lead to viewing the environment as overly hostile. This, in turn, increases the frequency, intensity, and duration of anxiety and fear episodes. Deployment of attention toward stimuli that pose little threat can also lead to underprocessing of valuable non-threat information and interfere with daily functioning. For these reasons,

attention bias is a key factor in the development and maintenance of clinical anxiety. Accordingly, accurate and reliable methods for assessing attention bias are important. Once detected, aberrant attentional components can be therapeutically targeted, with the intention of preventing clinical anxiety in vulnerable individuals or reducing symptoms for those who are clinically anxious. ABM protocols tested in RCTs have been successful in reducing anxiety in clinical patients, and it is hoped that conceptual, technological, and experimental advances will further improve on available assessment methods and interventions.

REFERENCES

Amir, N., Elias, J., Klumpp, H., & Przeworski, A. (2003). Attentional bias to threat in social phobia: Facilitated processing of threat or difficulty disengaging attention from threat? *Behaviour Research and Therapy*, *41*, 1325–1335. http://dx.doi.org/10.1016/S0005-7967(03)00039-1

Armstrong, T., & Olatunji, B. O. (2012). Eye tracking of attention in the affective disorders: A meta-analytic review and synthesis. *Clinical Psychology Review*, *32*, 704–723. http://dx.doi.org/10.1016/j.cpr.2012.09.004

Asmundson, G. J., Sandler, L. S., Wilson, K. G., & Walker, J. R. (1992). Selective attention toward physical threat in patients with panic disorder. *Journal of Anxiety Disorders*, *6*, 295–303. http://dx.doi.org/10.1016/0887-6185(92)90001-N

Ballenger, J. C. (2004). Remission rates in patients with anxiety disorders treated with paroxetine. *The Journal of Clinical Psychiatry*, *65*, 1696–1707. http://dx.doi.org/10.4088/JCP.v65n1216

Bar-Haim, Y. (2010). Research review: Attention bias modification (ABM): A novel treatment for anxiety disorders. *Journal of Child Psychology and Psychiatry*, *51*, 859–870. http://dx.doi.org/10.1111/j.1469-7610.2010.02251.x

Bar-Haim, Y., Lamy, D., Pergamin, L., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2007). Threat-related attentional bias in anxious and nonanxious individuals: A meta-analytic study. *Psychological Bulletin*, *133*, 1–24. http://dx.doi.org/10.1037/0033-2909.133.1.1

Barlow, D. H., Gorman, J. M., Shear, M. K., & Woods, S. W. (2000). Cognitive-behavioral therapy, imipramine, or their combination for panic disorder: A randomized controlled trial. *JAMA*, *283*, 2529–2536. http://dx.doi.org/10.1001/jama.283.19.2529

Beck, A. T., & Clark, D. A. (1997). An information processing model of anxiety: Automatic and strategic processes. *Behaviour Research and Therapy*, *35*, 49–58. http://dx.doi.org/10.1016/S0005-7967(96)00069-1

Becker, E. S., Rinck, M., Margraf, J., & Roth, W. T. (2001). The emotional Stroop effect in anxiety disorders: General emotional or disorder specificity? *Journal of Anxiety Disorders*, *15*, 147–159. http://dx.doi.org/10.1016/S0887-6185(01)00055-X

Biederman, J., Hirshfeld-Becker, D. R., Rosenbaum, J. F., Hérot, C., Friedman, D., Snidman, N., . . . Faraone, S. V. (2001). Further evidence of association between behavioral inhibition and social anxiety in children. *The American Journal of Psychiatry*, *158*, 1673–1679. http://dx.doi.org/10.1176/appi.ajp.158.10.1673

Biederman, J., Rosenbaum, J. F., Bolduc-Murphy, E. A., Faraone, S. V., Chaloff, J., Hirshfeld, D. R., & Kagan, J. (1993). A 3-year follow-up of children with and without behavioral inhibition. *Journal of the American Academy of Child & Adolescent Psychiatry*, *32*, 814–821. http://dx.doi.org/10.1097/00004583-199307000-00016

Broadbent, D. E. (1958). *Perception and communication*. London, England: Pergamon. http://dx.doi.org/10.1037/10037-000

Chronis-Tuscano, A., Degnan, K. A., Pine, D. S., Perez-Edgar, K., Henderson, H. A., Diaz, Y., . . . Fox, N. A. (2009). Stable early maternal report of behavioral inhibition

predicts lifetime social anxiety disorder in adolescence. *Journal of the American Academy of Child & Adolescent Psychiatry*, *48*, 928–935. http://dx.doi.org/10.1097/CHI.0b013e3181ae09df

Cisler, J. M., & Koster, E. H. W. (2010). Mechanisms of attentional biases towards threat in anxiety disorder: An integrative review. *Clinical Psychology Review*, *30*, 1–29.

Davis, M., & Whalen, P. J. (2001). The amygdala: Vigilance and emotion. *Molecular Psychiatry*, *6*, 13–34. http://dx.doi.org/10.1038/sj.mp.4000812

Dijksterhuis, A., & Aarts, H. (2003). On wildebeests and humans: The preferential detection of negative stimuli. *Psychological Science*, *14*, 14–18. http://dx.doi.org/10.1111/1467-9280.t01-1-01412

Duncan, J. (1980). The locus of interference in the perception of simultaneous stimuli. *Psychological Review*, *87*, 272–300. http://dx.doi.org/10.1037/0033-295X.87.3.272

Eastwood, J. D., Smile, D., Oakman, J. M., Farvolden, P., van Ameringen, M., Mancini, C., & Merikle, P. M. (2005). Individuals with social phobia are biased to become aware of negative faces. *Visual Cognition*, *12*, 159–179. http://dx.doi.org/10.1080/13506280444000175

Eldar, S., Ricon, T., & Bar-Haim, Y. (2008). Plasticity in attention: Implications for stress response in children. *Behaviour Research and Therapy*, *46*, 450–461. http://dx.doi.org/10.1016/j.brat.2008.01.012

Evans, T. C., & Britton, J. C. (2018). Improving the psychometric properties of dot-probe attention measures using response-based computation. *Journal of Behavior Therapy and Experimental Psychiatry*, *60*, 95–103. http://dx.doi.org/10.1016/j.jbtep.2018.01.009

Eysenck, M. W. (1992). *Anxiety: The cognitive perspective*. Hillsdale, NJ: Lawrence Erlbaum.

Eysenck, M. W. (1997). *Anxiety and cognition: A unified theory*. Hove, England: Psychology Press.

Foa, E. B., Ilai, D., McCarthy, P. R., Shoyer, B., & Murdock, T. (1993). Information processing in obsessive–compulsive disorder. *Cognitive Therapy and Research*, *17*, 173–189.

Fox, E., Lester, V., Russo, R., Bowles, R. J., Pichler, A., & Dutton, K. (2000). Facial expressions of emotion: Are angry faces detected more efficiently? *Cognition and Emotion*, *14*, 61–92. http://dx.doi.org/10.1080/026999300378996

Fox, E., Russo, R., Bowles, R., & Dutton, K. (2001). Do threatening stimuli draw or hold visual attention in subclinical anxiety? *Journal of Experimental Psychology: General*, *130*, 681–700. http://dx.doi.org/10.1037/0096-3445.130.4.681

Hakamata, Y., Lissek, S., Bar-Haim, Y., Britton, J. C., Fox, N. A., Leibenluft, E., . . . Pine, D. S. (2010). Attention bias modification treatment: A meta-analysis toward the establishment of novel treatment for anxiety. *Biological Psychiatry*, *68*, 982–990. http://dx.doi.org/10.1016/j.biopsych.2010.07.021

Hansen, C. H., & Hansen, R. D. (1988). Finding the face in the crowd: An anger superiority effect. *Journal of Personality and Social Psychology*, *54*, 917–924. http://dx.doi.org/10.1037/0022-3514.54.6.917

Hofmann, S. G., & Smits, J. A. J. (2008). Cognitive-behavioral therapy for adult anxiety disorders: A meta-analysis of randomized placebo-controlled trials. *The Journal of Clinical Psychiatry*, *69*, 621–632. http://dx.doi.org/10.4088/JCP.v69n0415

Jones, E. B., & Sharpe, L. (2017). Cognitive bias modification: A review of meta-analyses. *Journal of Affective Disorders*, *223*, 175–183. http://dx.doi.org/10.1016/j.jad.2017.07.034

Kolassa, I. T., & Miltner, W. H. R. (2006). Psychophysiological correlates of face processing in social phobia. *Brain Research*, *1118*, 130–141. http://dx.doi.org/10.1016/j.brainres.2006.08.019

Koster, E. H. W., Crombez, G., Verschuere, B., & De Houwer, J. (2004). Selective attention to threat in the dot probe paradigm: Differentiating vigilance and difficulty to disengage. *Behaviour Research and Therapy*, *42*, 1183–1192. http://dx.doi.org/10.1016/j.brat.2003.08.001

Lazarov, A., Abend, R., & Bar-Haim, Y. (2016). Social anxiety is related to increased dwell time on socially threatening faces. *Journal of Affective Disorders*, *193*, 282–288. http://dx.doi.org/10.1016/j.jad.2016.01.007

Lazarov, A., Ben-Zion, Z., Shamai, D., Pine, D. S., & Bar-Haim, Y. (2018). Free viewing of sad and happy faces in depression: A potential target for attention bias modification. *Journal of Affective Disorders*, *238*, 94–100. http://dx.doi.org/10.1016/j.jad.2018.05.047

Lazarov, A., Marom, S., Yahalom, N., Pine, D. S., Hermesh, H., & Bar-Haim, Y. (2017). Attention bias modification augments cognitive–behavioral group therapy for social anxiety disorder: A randomized controlled trial. *Psychological Medicine*, *48*, 2177–2185.

Lazarov, A., Pine, D. S., & Bar-Haim, Y. (2017). Gaze-contingent music reward therapy for social anxiety disorder: A randomized controlled trial. *The American Journal of Psychiatry*, *174*, 649–656. http://dx.doi.org/10.1176/appi.ajp.2016.16080894

LeDoux, J. E. (2009). Emotion circuits in the brain. *Focus*, *7*, 274–289. http://dx.doi.org/10.1176/foc.7.2.foc274

Linetzky, M., Pergamin-Hight, L., Pine, D. S., & Bar-Haim, Y. (2015). Quantitative evaluation of the clinical efficacy of attention bias modification treatment for anxiety disorders. *Depression and Anxiety*, *32*, 383–391. http://dx.doi.org/10.1002/da.22344

Lowther, H., & Newman, E. (2014). Attention bias modification (ABM) as a treatment for child and adolescent anxiety: A systematic review. *Journal of Affective Disorders*, *168*, 125–135. http://dx.doi.org/10.1016/j.jad.2014.06.051

Lundqvist, D., Flykt, A., & Öhman, A. (1998). The Karolinska directed emotional faces (KDEF) [CD ROM]. Solna, Sweden: Karolinska Institutet.

MacLeod, C., & Clarke, P. J. F. (2015). The attentional bias modification approach to anxiety intervention. *Clinical Psychological Science*, *3*, 58–78. http://dx.doi.org/10.1177/2167702614560749

MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology*, *95*, 15–20. http://dx.doi.org/10.1037/0021-843X.95.1.15

Mathews, A., & MacLeod, C. (2002). Induced processing biases have causal effects on anxiety. *Cognition and Emotion*, *16*, 331–354. http://dx.doi.org/10.1080/02699930143000518

McEvoy, P. M. (2007). Effectiveness of cognitive behavioural group therapy for social phobia in a community clinic: A benchmarking study. *Behaviour Research and Therapy*, *45*, 3030–3040. http://dx.doi.org/10.1016/j.brat.2007.08.002

McNally, R. J. (2019). Attentional bias for threat: Crisis or opportunity? *Clinical Psychology Review, 69*, 4–13. http://dx.doi.org/10.1016/j.cpr.2018.05.005

Mogg, K., & Bradley, B. P. (1998). A cognitive-motivational analysis of anxiety. *Behaviour Research and Therapy*, *36*, 809–848. http://dx.doi.org/10.1016/S0005-7967(98)00063-1

Mogoaşe, C., David, D., & Koster, E. H. W. (2014). Clinical efficacy of attentional bias modification procedures: An updated meta-analysis. *Journal of Clinical Psychology*, *70*, 1133–1157. http://dx.doi.org/10.1002/jclp.22081

Mohr, D. C., Burns, M. N., Schueller, S. M., Clarke, G., & Klinkman, M. (2013). Behavioral intervention technologies: Evidence review and recommendations for future research in mental health. *General Hospital Psychiatry*, *35*, 332–338. http://dx.doi.org/10.1016/j.genhosppsych.2013.03.008

Öhman, A., Flykt, A., & Esteves, F. (2001). Emotion drives attention: Detecting the snake in the grass. *Journal of Experimental Psychology: General*, *130*, 466–478. http://dx.doi.org/10.1037/0096-3445.130.3.466

Pérez-Edgar, K., Bar-Haim, Y., McDermott, J. M., Chronis-Tuscano, A., Pine, D. S., & Fox, N. A. (2010). Attention biases to threat and behavioral inhibition in early childhood shape adolescent social withdrawal. *Emotion*, *10*, 349–357. http://dx.doi.org/10.1037/a0018486

Pérez-Edgar, K., Reeb-Sutherland, B. C., McDermott, J. M., White, L. K., Henderson, H. A., Degnan, K. A., . . . Fox, N. A. (2011). Attention biases to threat link behavioral inhibition to social withdrawal over time in very young children. *Journal of Abnormal Child Psychology*, *39*, 885–895. http://dx.doi.org/10.1007/s10802-011-9495-5

Pergamin-Hight, L., Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Bar-Haim, Y. (2012). Variations in the promoter region of the serotonin transporter gene and biased attention for emotional information: A meta-analysis. *Biological Psychiatry*, *71*, 373–379. http://dx.doi.org/10.1016/j.biopsych.2011.10.030

Pergamin-Hight, L., Naim, R., Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Bar-Haim, Y. (2015). Content specificity of attention bias to threat in anxiety disorders: A meta-analysis. *Clinical Psychology Review*, *35*, 10–18. http://dx.doi.org/10.1016/j.cpr.2014.10.005

Pine, D. S., Helfinstein, S. M., Bar-Haim, Y., Nelson, E., & Fox, N. A. (2009). Challenges in developing novel treatments for childhood disorders: Lessons from research on anxiety. *Neuropsychopharmacology*, *34*, 213–228. http://dx.doi.org/10.1038/npp.2008.113

Posner, M. I. (1980). Orienting of attention. *The Quarterly Journal of Experimental Psychology*, *32*, 3–25. http://dx.doi.org/10.1080/00335558008248231

Price, R. B., Kuckertz, J. M., Siegle, G. J., Ladouceur, C. D., Silk, J. S., Ryan, N. D., . . . Amir, N. (2015). Empirical recommendations for improving the stability of the dot-probe task in clinical research. *Psychological Assessment*, *27*, 365–376. http://dx.doi.org/10.1037/pas0000036

Putman, P., Hermans, E., & van Honk, J. (2004). Emotional Stroop performance for masked angry faces: It's BAS, not BIS. *Emotion*, *4*, 305–311. http://dx.doi.org/10.1037/1528-3542.4.3.305

Rapee, R. M., MacLeod, C., Carpenter, L., Gaston, J. E., Frei, J., Peters, L., & Baillie, A. J. (2013). Integrating cognitive bias modification into a standard cognitive behavioural treatment package for social phobia: A randomized controlled trial. *Behaviour Research and Therapy*, *51*, 207–215. http://dx.doi.org/10.1016/j.brat.2013.01.005

Richards, H. J., Benson, V., Donnelly, N., & Hadwin, J. A. (2014). Exploring the function of selective attention and hypervigilance for threat in anxiety. *Clinical Psychology Review*, *34*, 1–13. http://dx.doi.org/10.1016/j.cpr.2013.10.006

Riemann, B. C., Kuckertz, J. M., Rozenman, M., Weersing, V. R., & Amir, N. (2013). Augmentation of youth cognitive behavioral and pharmacological interventions with attention modification: A preliminary investigation. *Depression and Anxiety*, *30*, 822–828. http://dx.doi.org/10.1002/da.22127

Rinck, M., Becker, E. S., Kellermann, J., & Roth, W. T. (2003). Selective attention in anxiety: Distraction and enhancement in visual search. *Depression and Anxiety*, *18*, 18–28. http://dx.doi.org/10.1002/da.10105

Schmukle, S. C. (2005). Unreliability of the dot probe task. *European Journal of Personality*, *19*, 595–605. http://dx.doi.org/10.1002/per.554

Shechner, T., Rimon-Chakir, A., Britton, J. C., Lotan, D., Apter, A., Bliese, P. D., . . . Bar-Haim, Y. (2014). Attention bias modification treatment augmenting effects on cognitive behavioral therapy in children with anxiety: Randomized controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry*, *53*, 61–71. http://dx.doi.org/10.1016/j.jaac.2013.09.016

Staugaard, S. R. (2009). Reliability of two versions of the dot-probe task using photographic faces. *Psychology Science*, *51*, 339–350.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, *18*, 643–662.

Treisman, A. M. (1969). Strategies and models of selective attention. *Psychological Review*, *76*, 282–299. http://dx.doi.org/10.1037/h0027242

Van Bockstaele, B., Verschuere, B., Tibboel, H., De Houwer, J., Crombez, G., & Koster, E. H. W. (2014). A review of current evidence for the causal impact of attentional

bias on fear and anxiety. *Psychological Bulletin*, *140*, 682–721. http://dx.doi.org/
10.1037/a0034834

Waechter, S., Nelson, A. L., Wright, C., Hyatt, A., & Oakman, J. (2014). Measuring
attentional bias to threat: Reliability of dot probe and eye movement indices. *Cognitive
Therapy and Research*, *38*, 313–333. http://dx.doi.org/10.1007/s10608-013-9588-2

White, L. K., Degnan, K. A., Henderson, H. A., Pérez-Edgar, K., Walker, O. L.,
Shechner, T., . . . Fox, N. A. (2017). Developmental relations among behavioral
inhibition, anxiety, and attention biases to threat and positive information. *Child
Development*, *88*, 141–155. http://dx.doi.org/10.1111/cdev.12696

White, L. K., Sequeira, S., Britton, J. C., Brotman, M. A., Gold, A. L., Berman, E., . . .
Pine, D. S. (2017). Complementary features of attention bias modification therapy
and cognitive-behavioral therapy in pediatric anxiety disorders. *The American Jour-
nal of Psychiatry*, *174*, 775–784. http://dx.doi.org/10.1176/appi.ajp.2017.16070847

Wieser, M. J., Hambach, A., & Weymar, M. (2018). Neurophysiological correlates of
attentional bias for emotional faces in socially anxious individuals: Evidence from a
visual search task and N2pc. *Biological Psychology*, *132*, 192–201. http://dx.doi.org/
10.1016/j.biopsycho.2018.01.004

Wikström, J., Lundh, L. G., Westerlund, J., & Högman, L. (2004). Preattentive bias for
snake words in snake phobia? *Behaviour Research and Therapy*, *42*, 949–970. http://
dx.doi.org/10.1016/j.brat.2003.07.002

Yiend, J. (2010). The effects of emotion on attention: A review of attentional process-
ing of emotional information. *Cognition and Emotion*, *24*, 3–47. http://dx.doi.org/
10.1080/02699930903205698

13

Interpersonal Processes

Jonathan S. Abramowitz and Donald H. Baucom

Jerry is a 53-year-old devoutly religious man with a diagnosis of obsessive-compulsive disorder (OCD).[1] His obsessions focus on thoughts that he has sinned by having too many "impure thoughts" (e.g., thoughts about sex). He is afraid God is upset with him and that he will go to hell when he dies. He also engages in excessive praying rituals when such obsessions come to mind and tries to avoid stimuli (e.g., anything related to sexuality) that triggers these thoughts. After his wife, Anna, failed to convince Jerry that his thoughts were not sinful, she agreed to watch only "wholesome," family-friendly TV channels, as Jerry wished. Anna also agreed not to wear clothes Jerry considered "seductive" to avoid triggering Jerry's obsessions. Although Anna is frequently frustrated about what has become the status quo, she is willing to go along with her husband because she knows that anything different could lead to anxiety and anger. Anna reports that giving in to (i.e., accommodating) Jerry's OCD symptoms is how she shows him that she loves and cares for him.

Although research has typically focused on how clinical anxiety affects the individual with marked distress and interference in functioning, severe anxiety can have equally detrimental effects on interpersonal relationships (e.g., partner, spouse, parent, other close relative).[2] In turn, relationship difficulties also influence the trajectory of clinical anxiety. This chapter describes two primary ways in which this occurs: first, a caregiver may inadvertently maintain

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[1]All clinical case material has been altered to protect patient confidentiality.
[2]For the purposes of this chapter, we refer to the individual with an anxiety disorder as the *patient* and those with whom the patient has close interpersonal relationships as *caregiver*.

symptoms by "helping" the patient avoid or escape from anxiety (i.e., *accommodation*); this mechanism is focal to how the couple interacts around the problem with anxiety. Second, relationship conflict may exacerbate the anxiety; this mechanism focuses on a broader, more defuse negative atmosphere that increases anxiety. This chapter also discusses conceptual implications of these phenomena, before turning to assessment and implications for treatment.

The case example illustrates the process of symptom accommodation. Accommodation occurs when a caregiver of someone with anxiety modifies their typical behavior to take part in anxiety-reduction strategies (e.g., by helping with avoidance strategies), to assume daily responsibilities for the patient (e.g., doing shopping), or to help to resolve problems that have resulted from the patient's anxiety symptoms (e.g., contributing money to ease the costs of anxiety-reduction behavior; Boeding et al., 2013). The accommodation might occur because of negative consequences that the caretaker experiences if the caregiver does not engage in accommodation (e.g., the patient becomes furious or makes threats). It might also occur because the caregiver wants to express care and concern for the patient by helping to "protect" him or her from feeling anxious.

Accommodation can be subtle or overt, is often performed with positive intentions, and is observed in interpersonal relationships that are either distressed or nondistressed. For example, Anna boasted that she and Jerry rarely argued about OCD-related issues. Yet, even if there is no obvious arguing, accommodation is usually accompanied by frustration on the part of the caregiver, and it creates a relationship "system" that fits with the anxious symptoms to perpetuate the vicious cycle that maintains the problem (as discussed in greater detail following). Table 13.1 shows examples of accommodation

TABLE 13.1. Examples of Accommodation Behaviors in Different Anxiety Disorders

Anxiety disorder	Partner accommodation behaviors
Obsessive-compulsive disorder	Changing clothes for someone with contamination obsessions; answering compulsive requests for reassurance that the door is locked
Social anxiety disorder	Helping to come up with excuses for missing social gatherings; agreeing to leave a social gathering early because a partner feels anxious
Panic disorder/agoraphobia	Accompanying a partner on errands out of the house; paying for visits to the emergency room during panic attacks
Illness anxiety disorder	Answering questions about health-related issues; agreeing not to mention certain feared diseases
Phobias	Volunteering to go to higher floors of a building to run errands; checking the weather and providing constant updates and reassurance about the probability of thunderstorms
Posttraumatic stress disorder	Agreeing to avoid the place where a partner was raped; agreeing never to discuss a car accident
Separation anxiety disorder	Writing notes to the teacher to justify absences for a child afraid of going to school; allowing an anxious child to sleep in the parents' bed (or a parent sleeping with the child in the child's bed)

behaviors observed with couples and families in which one member has an anxiety disorder diagnosis.

Studies suggest symptom accommodation is all but ubiquitous when anxiety occurs in the context of a close interpersonal relationship, whether between romantic partners or a parent and child (e.g., Boeding et al., 2013; Lebowitz et al., 2013; Norman, Silverman, & Lebowitz, 2015), with as much as 90% to 97% of caregivers reporting engaging in at least some accommodation (e.g., Calvocoressi et al., 1999; Thompson-Hollands, Kerns, Pincus, & Comer, 2014). Moreover, accommodation can be costly regarding time and money, as affected families might end up depleting their resources while incurring decreased productivity (e.g., Bodden et al., 2008).

Finally, several studies have identified predictors of accommodation behavior among caregivers. In one study, Amir, Freshman, and Foa (2000) found that caregivers with greater levels of general anxiety and depression themselves engaged in more accommodation. Another found that caregiver levels of empathy—the capacity for taking another person's perspective and sharing a congruent emotional reaction—were positively associated with levels of accommodation (Caporino et al., 2012). The point correlates to a third reason that caregivers might engage in accommodation: to avoid or reduce their own negative emotions. Sensitivity to guilt also appears related to the tendency to accommodate a patient's anxiety (Cosentino et al., 2015). Specifically avoiding the guilt of not helping a loved one was a motivating factor for engaging in symptom accommodation. Finally, the tendency toward greater expressed emotion (EE)—the extent to which caregivers (and family members in general) express critical, hostile (i.e., rejecting), or emotionally overinvolved (or overprotective) attitudes—is related to higher levels of accommodation (Amir et al., 2000).

RELATIONSHIP CONFLICT

Relationships in which one individual has clinically severe anxiety are often characterized by interdependency, unassertiveness, and avoidant communication patterns that foster stress and conflict (Marcaurelle, Bélanger, Marchand, Katerelos, & Mainguy, 2005; McCarthy & Shean, 1996). Relatives of patients with anxiety may also engage in arguments about the seeming illogic of the anxiety, which elevates the general level of relationship stress. EE is not only a predictor of accommodation but also of anxious psychopathology and relapse following successful treatment (Chambless, Bryan, Aiken, Steketee, & Hooley, 2001). Anxiety and relationship distress, however, influence each other in a recursive manner rather than one exclusively leading to the other. The disagreements that occur when a patient with social anxiety refuses to attend work parties might further contribute to the patient's social anxiety, leading to further disagreements. As another example, consider Joan, a 32-year-old with panic attacks and agoraphobia who lives with her mother. Joan insists that her mother be at her beck and call and asks that her mother not leave the

house in case Joan begins to experience a panic attack. Yet, the frequent arguments that occur over this situation increase Joan's physiological arousal, which often triggers her panic attacks.

Relationship conflict does not have to be focal to the anxiety problem to increase relationship distress and contribute to the maintenance of anxiety. Among families, homework, chores, problems with academic or social functioning, finances, and health concerns may serve to increase ambient levels of stress, leading to increased anxiety. Within romantic partnerships, disagreements over child care, financial decisions, and in-laws, among others, may have the same effects. Such disagreements may be fueled by poor problem-solving skills, a tendency toward hostility and criticism (Marcaurelle et al., 2005), and general emotional overinvolvement.

In conclusion, it is important to differentiate between two ways that relationship functioning might maintain or exacerbate anxiety. First, the ways that caregivers and patients interact around anxiety can involve accommodation, which can lower the patient's anxiety in the short term. But by helping the patient avoid or escape anxiety, the accommodation contributes to maintenance or exacerbation of the anxiety long term through negative reinforcement. In this instance, there is no assumption that there is relationship distress present; in fact, very loving caregivers might inadvertently accommodate to the patient's symptoms. Relationship distress operates in a different manner by serving as a broad, diffuse, chronic stressor on the patient, which is likely to exacerbate symptoms, even if the relationship discord is not focal to experiences with anxiety.

CONCEPTUAL IMPLICATIONS

Empirically supported approaches to understanding clinical anxiety and fear generally stem from Beck's (1976) cognitive model of emotion, which holds that strong negative emotions result from certain types of mistaken beliefs. Anxiety and fear are conceptualized as arising largely from overestimates of the likelihood and severity of danger and underestimates of an individual's ability to cope, which lead to the unwarranted perception of threat. The individual then deploys safety behaviors (e.g., avoidance, compulsive rituals, use of safety cues and behaviors) to control the anxiety and reduce the perceived threat. As discussed in greater detail in Chapter 2, safety behaviors prevent the natural disconfirmation of the mistaken cognitions (and extinction of fear) because they artificially eliminate the perceived threat and a compelling alternative explanation for why danger did not occur (other than the fact that threat was low to begin with). As a result, the faulty overestimates of threat persist. Moreover, because safety behaviors technically "work" as an immediate (albeit temporary) escape from feelings of anxiety, they are negatively reinforced and become habitual, leading to the long-term maintenance (and intensification) of the irrational fear and anxiety.

Accommodation is conceptualized as a maintaining factor in this process: Regardless of who performs the safety behavior (or supports and encourages it), its consequences are the same (i.e., prevention of natural fear extinction). By accommodating, the caregiver inadvertently perpetuates anxiety symptoms by preventing the anxious person from learning that their fear-based concerns are unlikely to materialize, and that anxiety (and fear) itself is harmless and manageable. For example, consider a mother with obsessional thoughts of acting on unwanted impulses to molest her newborn infant. Her partner, by taking over all childcare responsibilities and thereby encouraging avoidance of the infant, prevents the mother from learning that her intense anxiety over these obsessions is temporary and harmless, and that she is unlikely to act on these obsessions. It also prevents the mother from learning how to manage inevitable unwanted thoughts and uncertainties. From a functional perspective, symptom accommodation enacted by a caregiver is identical to safety behaviors and avoidance strategies performed by the patient with clinical anxiety.

Accommodation has several additional negative consequences. First, it might decrease the patient's motivation to engage in treatment because he or she might not perceive good reasons to change the status quo—especially if treatment involves facing his or her fears (i.e., exposure therapy). For example, a woman with fears of bees avoided leaving her home during the spring and summer when bees are commonly found outside. Her partner handled all the shopping and errands during this time. Although the woman regretted the impact of this phobia on her life, she struggled to commit to exposure therapy (i.e., to going outside and learning that bee stings are relatively rare) partly because she did not view taking such "risks" as worthwhile, because her partner's accommodation had diminished the consequences of the extreme phobic avoidance to the point that the problem seemed tolerable relative to confronting her fears.

In some relationships, accommodation becomes the chief way in which a caregiver expresses warmth, caring, and compassion for the patient. For example, one man prided himself on the fact that whenever his adult daughter with panic attacks and health-related anxiety became very anxious and worried, he would "come to the rescue" by traveling to wherever she was to calm her down and reassure her that she was going to be fine. This became an important way of showing care in their father–daughter relationship. Not only does such accommodation maintain pathological fear and anxiety in ways that have been discussed (i.e., by preventing the daughter from learning that fear subsides on its own and is not dangerous), it also begets additional accommodation as the relationship develops around this sort of caring behavior. Not surprisingly, accommodation is related to more severe anxiety symptoms and poorer long-term treatment outcome (Calvocoressi et al., 1999). Accommodation might also carry with it the meaning that "you need me to take care of you" and that the patient cannot take care of herself or himself. Whether intended or not, such actions might undermine the sense of self-efficacy of the patient which can lead to further avoidance and escape from distressing situations.

Relationship conflict is also conceptualized as a maintaining factor of clinical anxiety. Research demonstrates the role that increased stress plays in the exacerbation of anxiety symptoms. Moreover, this relationship is reciprocal, with increased anxiety and related behavioral patterns often resulting in more frequent conflicts within the relationship. It is hardly surprising that relatives living with patients with clinical anxiety often have some negative feelings about the patient, given the strains anxiety and fear place on family life and the associated burden on the relatives themselves. Findings from research with patients with OCD and agoraphobia suggest that EE, and hostility in particular, is related to clinical anxiety and dropout from treatment (Chambless & Steketee, 1999). Such hostility might lead to reduced motivation on the part of the patient. In contrast, when caregivers express dissatisfaction with disorder-specific aspects of patients' behavior (e.g., anxiety symptoms) but do not reject the patients themselves, such comments may have positive motivational consequences.

ASSESSMENT

There are several approaches to assessing accommodation and other relationship factors that are part of the maintenance of anxiety. This section describes clinical interviews and other empirically supported measures that practitioners can use to provide an indication of the presence of these factors.

Assessing Symptom–System Fit

An important focus of assessment concerns the *symptom–system fit*, which refers to how the environment in which the relationship exists is structured so as to accommodate anxiety. As previously discussed, accommodation may occur within seemingly "happy" relationships (i.e., "good" symptom–system fit) or within conflicted relationships in which the caregiver refuses to accommodate anxiety symptoms or overtly resents the negative impact these symptoms have on the relationship (i.e., "poor" symptom–system fit). Exhibit 13.1 is a list of suggested questions for engaging patient and caregiver in an unstructured discussion to assess symptom–system fit and identify specific ways in which the two parties relate concerning anxiety symptoms.

A brief psychological assessment of any caregiver who might become involved in treatment for anxiety is also suggested for the purpose of noting (a) whether this individual experiences any psychopathology of his or her own and (b) what factors might have contributed to the development of an interpersonal system in which the patient's anxiety flourishes. For example, a woman whose first husband died of a heart attack was especially sensitive to her current husband's posttraumatic stress disorder (PTSD) symptoms for fear that they would also lead to a heart attack. She willingly did everything she could to keep her current husband from becoming even slightly anxious, thereby contributing to the maintenance of his PTSD symptoms. The woman

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EXHIBIT 13.1

**Questions for Assessing Symptom–System Fit
(obtain responses from each party)**

- When and how did the caregiver become aware of the patient's problem with anxiety?
- What effects have anxiety symptoms (fear, avoidance, safety behaviors) had on the relationship in terms of daily life?
- If there are any patterns that seem to have developed because of the patient's anxiety symptoms, what are they?
- How does each person think their relationship might be different if the patient did not have difficulties with anxiety?
- Is there anyone else who is affected in any way by the patient having problems with anxiety? (If so, explore who and how.)
- What types of strategies have you tried to use to cope with the patient's anxiety?
- When the patient is experiencing fear or performing safety behaviors, does it ever lead to anger or arguments? What happens in these situations?
- Does the caregiver ever tend to help the patient escape from the anxiety, avoid situations that cause anxiety, or assist with safety behaviors to lower the anxiety? How well has this worked?
- Describe how the two of you communicate about the anxiety problem.

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had to be educated about the short-term effects of anxiety and how these effects are unlikely to be dangerous.

Family Accommodation Scale and Its Variants

Calvocoressi, Lewis, Harris, and Trufan (1995) pioneered the systematic measurement of family accommodation by developing the 13-item Family Accommodation Scale (FAS) as an index of the type and frequency of accommodation behaviors performed by caregivers (e.g., parents) of children with OCD. The FAS is administered to the caregiver in a clinician-rated semistructured interview. It consists of two sections. The first section is an OCD-symptom checklist adapted from the symptom checklist in the Yale–Brown Obsessive-Compulsive Scale, which is considered the gold standard in assessing the presence and severity of OCD symptoms in adults (Goodman et al., 1989). This section is primarily used to (a) assess the caregiver's awareness of the patient's OCD symptoms and (b) serve as probes when querying about family accommodation in the second section of the measure. The second section examines the caregiver's accommodating behaviors by assessing modifications of routines, provision of reassurance, facilitation of compulsive rituals, direct participation in rituals, avoidance of certain situations, modifying the patient's responsibilities, and permitting compulsions to happen (e.g., waiting for them, tolerating disruptions). Relatives are asked to provide the frequency of such accommodating behaviors on a scale from 0 (*never*) to 4 (*everyday*). The scores are then summed to obtain a total score. Not only does the FAS have good internal

consistency and strong interrater agreement, but there is also strong evidence for convergent and discriminant validity.

More recently, Pinto, Van Noppen, and Calvocoressi (2013) created a more user-friendly self-report version of the FAS for the caregiver to complete. The language and wording of the items in the new measure were modified to be more appropriate for nonclinicians, increasing the accuracy of responses provided by the relatives. The self-report version assesses accommodating behaviors in the past week and has excellent internal consistency (Cronbach's α = .90) and good convergent validity. They also found good agreement between the self-report and the clinician-related version of the scale.

Lebowitz and colleagues (2013) adapted the parent self-report version of the FAS for use with other anxiety-related disorders. They reworded the items and modified the rating scale, finding that this modification has good psychometric properties. Subsequently, Lebowitz, Scharfstein, and Jones (2015), interested in the convergence of child and parent report of accommodation, developed a child-report version of the FAS for children with anxiety disorders. Items were rephrased so that a child could respond about the parents' accommodation behavior. For example, the parent item "How often did you assist your child in avoiding things that might make him/her more anxious?" was rephrased to "How often did your parent help you to avoid things that make you feel anxious?".

Camberwell Family Interview

The Camberwell Family Interview (Leff & Vaughn, 1985) is a semistructured clinician-administered tool considered the gold-standard measure of EE. It is conducted with the patient's key caregiver(s) (typically a parent or a spouse) without the patient being present (parents are interviewed separately). The interview, often used in research on family factors in psychopathology, is more like a conversation with the caregiver than a formal interview. Its questions address (a) the onset of the patient's difficulties, (b) level of tension in the household, (c) irritability, (d) the patient's participation in routine household tasks, and (e) the daily routines of the patient and various family members. The typical length of the interview is between 1 and 2 hours. Following the interview, the clinician makes ratings on five scales: criticism, hostility, emotional overinvolvement, warmth, and positive remarks (the first three scales are most relevant to EE). On the basis of these ratings, caregivers can be classified as high or low in EE.

Several of these subscales have relevance to the constructs currently under consideration. Most focal to accommodation is the notion of emotional overinvolvement, which includes several factors like excessive self-sacrifice. Excessive self-sacrifice involves the caregiver changing his or her own life and schedule to an extreme degree to take care of the patient, when such changes are not necessarily needed. In a further refinement of this concept, Fredman, Baucom, Miklowitz, and Stanton (2008) differentiated between appropriate

high levels of involvement and excessive high levels of involvement, depending on the patient's abilities to care for self and engage in distressing situations. The subscales of criticism and hostility likely have very different effects and appear to be some of the most deleterious behaviors that caregivers direct at patients, often within the context of dissatisfied relationship, more focal to assessing the effects of distressed relationships on the patient.

Level of Expressed Emotion Scale

The Level of Expressed Emotion (LEE) scale (Cole & Kazarian, 1988) is a 60-item self-report measure that assesses the emotional environment in the patient's most important relationships. There are two forms: The patient version asks patients to evaluate their relationship with their closest caregiver, and the relative version requires the caregiver to evaluate his or her relationship with the patient. All items are rated in a true–false format and both versions of the LEE include four subscales: intrusiveness, emotional response, attitude toward illness, and tolerance and expectations. Because the LEE is a self-report measure, many clinicians find that it is easier to administer and requires less time to score than the Camberwell Family Interview.

Perceived Criticism

Easier to administer is the Perceived Criticism measure (PC; Hooley & Teasdale, 1989), which is based on the idea that criticism is the most important element of EE (e.g., Hooley & Teasdale, 1989), and simply asks patients to rate how critical of them is their caregiver using a 10-point Likert-type scale. In addition, using the same scale, the PC asks patients how critical of their caregiver are they. The PC can also be administered to the caregiver using the same rating scales. This measure provides a very quick assessment of the negative atmosphere that is created in the relationship. Depending on how the item is phrased, the assessment can provide information about how much criticism there is about the disorder versus the overall level of criticism in the relationship.

Relationship Adjustment

The above measures target specific aspects of the couple relationship that are more focal to psychopathology. In addition, the overall tone of the relationship creates an environment that can either add to or alleviate stress that the patient is experience more broadly, as well as impact whether a caregiver is motivated to assist in the patient's treatment. Therefore, an overall measure of relationship adjustment can serve as a meaningful index of the overall satisfaction that each partner experiences in the relationship.

The 32-item Dyadic Adjustment Scale (Spanier, 1976) is one of the most widely used measures of relationship adjustment, with good reliability and validity. Whereas subscales have been devised, the overall summary score

provides a simple assessment of relationship satisfaction. Scores can range from 0 to 151, with higher scores indicating greater relationship satisfaction. A score below 100 indicates relationship distress.

A more recent measure of relationship satisfaction that has taken advantage of recent scale development strategies is the Couples Satisfaction Index (Funk & Rogge, 2007), which demonstrates notable construct validity, is highly correlated with longer measures of the same construct, and exists in different lengths dependent on the needs of the user, including 4-, 8-, 16-, and 32-item versions.

CLINICAL IMPLICATIONS

In this section, interpersonal phenomena are placed within a clinical framework and how these processes present across different presentations of fear/anxiety is discussed. Interventions that can be used to mitigate interpersonal processes that maintain clinical anxiety are also reviewed.

Transdiagnostic Presentation of Accommodation

As discussed previously, symptom accommodation is present transdiagnostically, such that clinicians are bound to encounter examples of it in almost all anxious patients who live with or depend on one or more caregivers. The following section describes how such accommodation behavior may manifest itself across anxiety-related diagnoses to illustrate when, why, and how clinicians can assess for such behavior. The treatment of accommodation behavior is also discussed. Aside from the behaviors described here, there are many healthy forms of support and caregiving which may or may not have anxiety-reducing qualities.

Obsessive-Compulsive Disorder

The ubiquity of compulsive rituals and avoidance behaviors in patients with OCD provides rich opportunities for caregivers to accommodate. As OCD is a highly heterogeneous condition (e.g., Abramowitz et al., 2010), so are the ways that accommodation manifests, and clinicians are wise to assess for it carefully when working with patients involved in intimate relationships or living with relatives.

Among patients with contamination obsessions, caregiver accommodation often involves washing and cleaning rituals (e.g., doing extra loads of laundry) for the patient or helping the patient avoid feared contaminants. It is not uncommon for caregivers to change shoes or clothes to help keep their loved one's anxiety at bay, avoid contact with certain stimuli (e.g., the mail) before it has been "decontaminated" by the patient, and avoid going into certain rooms in the house. For example, a patient may be afraid to leave her room because of contamination fears, and her parents accommodate this by bringing

all food (and other requested items) to their daughter's room and engage in a lengthy decontamination ritual before entering.

Reassurance about safety might also be given: A patient who is fearful of rabies may insist her husband come to inspect any dead animal she jogs past on her morning runs. Other accommodation is more subtle: a mother always samples her son's food before he began to eat to reassure him that the food was safe to eat. Other manifestations of the accommodation of contamination obsessions include purchasing (or providing funding for) "heavy duty" or unnecessary cleaning products (e.g., extra strength soaps and detergents) and supplies (e.g., extra toilet paper). Delaying or cancelling previously scheduled family events because a patient is performing lengthy cleaning and washing rituals is another form of accommodation.

Among patients with checking and reassurance-seeking rituals, accommodation typically includes providing reassurance in the form of actual checking for (or with) the patient (e.g., checking the stove, looking up information on the Internet) or repeatedly answering questions. Such questions might pertain to whether the patient has committed a sin or mistake, whether they have harmed someone, questions about sexual preference, religious faith, or about someone's "true" nature ("Am I a pedophile just because I was thinking about it?" "Do I have OCD or some other problem?"). Patients might also ask caregivers whether they have had similar thoughts, feelings, or physical sensations as the patient. It is important to note that responding once to the honest asking of such questions would not constitute accommodation; yet, caregivers often find themselves repeating themselves in response to the same (or very similar) questions being asked again and again. If the patient already knows (or could assume) the answer to his or her question, the question is more likely functioning as a compulsive ritual or attempt to seek reassurance— a form of accommodation that serves the purpose of temporarily reducing the patient's distress.

Patients with obsessions about taboo topics such as sex, violence, or blasphemy often engage in avoidance of stimuli that trigger such thoughts and mandate that their caregivers do the same. Examples include avoiding certain movies, TV shows, words, places, and people. Caregivers may go to great lengths to avoid or keep the patient from having to experience such triggers and the obsessional thoughts they provoke. Patients with taboo obsessions may also confess their thoughts to loved ones, and listening to such confessions is considered a form of accommodation.

Social Anxiety Disorder

In the context of social anxiety, accommodation often manifests in the caregiver speaking for the anxious person. This might involve making phone calls on behalf of the individual, ordering food in a restaurant, or returning unwanted items to a store, among others. When the patient is unable to assertively decline an invitation, the caregiver might volunteer to do so in his or her place or provide an excuse. Caregivers might also take responsibility for sheltering patients

from potential social situations the caregivers anticipate would be difficult for the patients. In extreme instances, accommodation by parents involves allowing an adult child to live at home and avoid all social interactions (e.g., school, dating, job interviews, employment). In such instances, the parents might work to meet many (or all) of the patient's needs so he or she does not have to experience distress. Thus, accommodation often takes the form of helping the patient avoid potentially anxiety-provoking social interactions. In addition, many caregivers agree to leave social settings when the patient becomes anxious. At a social gathering, a mere whisper from a patient that "I want to leave now," can be enough to terminate the pair's presence at the event, lowering the patient's anxiety through an escape response.

Panic Disorder, Agoraphobia, and Health/Illness-Related Anxiety

Accommodation for patients with panic attacks and agoraphobia might take various forms, including acting as a "safe person" and accompanying the patient on all trips out of the home. The goal of the accommodation is to keep the anxious individual from having to experience "too much" anxiety on the basis of the belief that this could have serious negative consequences. Other caregivers might offer to run errands for the anxious person or, as in social anxiety, provide cover for the patient to be excused from responsibilities outside the home. One form of accommodation involves shifting roles and responsibilities to allow the person with agoraphobia to remain in safe places close to home. Volunteering to be easily available (e.g., by phone) in case of a panic attack or other health problem, providing reassurance about health and illness (e.g., answering questions, helping with researching illnesses), taking the patient (and paying for) for unnecessary doctor visits or medical tests, and providing resources (financial or otherwise) for patients who believe they require special medical care or refuse to leave the home (e.g., to go to work) are also common accommodation behaviors.

Specific Phobias and Separation Anxiety

For adults and children with phobias, including separation anxiety, caregiver accommodation involves helping with avoidance and providing reassurance. Some parents go to great lengths to provide reassurance and/or help their child not have to confront otherwise age appropriate situations such as going to school, spending the night at a friend's house (e.g., by providing excuses), sleeping in their own room (e.g., sleeping with them, allowing them to sleep with the caregiver), or meeting new animals (e.g., asking neighbors to conceal their pets). Because specific phobias involve singular stimuli that evoke fear, caregivers often can find ways to help the patient avoid this specific aspect of their lives.

Posttraumatic Stress Disorder

Caregivers of those with PTSD accommodate by helping the individuals avoid triggers or reminders of the traumatic experience. As an example, a caregiver helped the patient avoid having to go out at night after she had been raped at

night. The caregiver did this by arranging for all social events to take place during the day. Other forms of accommodation include providing unnecessary reassurance of safety, helping with safety cues and behaviors (e.g., installing extra locks, purchasing weapons for safety), and helping with checking for safety. Caregivers also try to help the patient avoid triggers by informing other family members what is acceptable and unacceptable to say. The family might be told never to talk about war or never to ask about a patient's experiences as a firefighter. There are several ways that loved ones attempt to rearrange the patient's environment to help them avoid potential triggers or reminders of the traumatic event.

Just as with other fear and anxiety-based disorders, at times, caregivers provide ongoing reassurance to patients with PTSD. Some individuals with PTSD experience great guilt that they were at fault for the trauma, which may have impacted or killed other individuals. In such instances, family members might provide repeated reassurance that it was not the patient's fault. Unfortunately, such reassurance rarely has durable anxiolytic effects and must be repeated.

One of the most damaging posttraumatic symptoms to relationships is the emotional numbing that accompanies patients with PTSD. In many instances, it appears that the patient's system for experiencing negative and positive emotions has almost shut down, making it difficult for caregivers to relate to the patient. Fearing what will happen if the patient experiences emotions or not knowing what to do, caregivers accommodate in a more passive manner by going along with the emotional distance. Family members interact with the patient in a less emotional manner, effectively validating the message that experiencing emotions might be dangerous. It is difficult for the patient to process the traumatic event or resume a healthy life if the patient continues to avoid emotions in their daily life.

Rationale for Targeting Interpersonal Factors in Treatment

There is evidence that relationship functioning impacts treatment outcome in anxiety-related disorders. Higher levels of family accommodation at baseline predicted poorer treatment outcome (i.e., greater symptom severity posttreatment) in a pediatric OCD sample (Garcia et al., 2010). However, greater decreases in accommodation from pre- to posttest were associated with better treatment response in symptom severity and impairment (Merlo, Lehmkuhl, Geffken, & Storch, 2009). Piacentini and colleagues (2011) also found that improvement in OCD symptoms followed decreases in accommodation behavior. Results such as these, as well as the bidirectional association between anxiety symptoms and interpersonal functioning suggests that involving caregivers in treatment will enhance short- and long-term outcomes of interventions for anxiety disorders—especially cognitive behavior approaches.

The remainder of this chapter describes techniques for involving caregivers in cognitive behavior therapy for anxiety to address interpersonal maintenance factors, particularly accommodation. Abramowitz, Baucom, Boeding,

and colleagues (2013) focused on adult romantic (e.g., married or committed) couples in which one partner has been diagnosed with an anxiety disorder, but much of this work is generalizable to other types of close personal relationships (e.g., parent–child) involving anxious patients of any age. In addition to accommodation as a specific set of behaviors focal to the disorder, relationship distress can also impact the patient's functioning as a broad, diffuse stressor on the patient. Therefore, addressing relationship distress when it is present is also an important intervention for these couples. However, because cognitive behavior interventions for addressing relationship distress are well documented elsewhere (e.g., Epstein & Baucom, 2002), this chapter focuses on interventions specific to the disorder within a relationship context.

Psychoeducation

Presenting the cognitive behavior conceptual model of anxiety can help reduce a caregiver's expressions of resentment and criticism, normalize his or her experience, and begin to alleviate feelings of guilt and frustration about the patient's experiences with anxiety. Similarly, learning about how treatment operates, and the evidence for its effectiveness, can increase hopefulness and reduce feelings of helplessness and of being overwhelmed. For example, when Frank began to understand that his daughter Chelsea's resistance to spending time at her grandparents' home arose from her OCD-related obsessional fears about the possibility of radon gas in their home, rather than from her dislike of his parents, Frank was less critical of Chelsea and her behavior. Knowing that Chelsea would be participating in an effective treatment further increased his patience.

Many caregivers also find the notion of exposure therapy counterintuitive, often believing that their role is to help their loved one stay away from anxiety-provoking situations or alleviate distress if anxiety cannot be avoided. Education helps caregivers understand that their role is to help the patient confront the anxiety, realize that it is not harmful or dangerous, and develop skills for how to "stick it out" and "get through" the unpleasant feelings and internal sensations until they dissipate on their own

Caregiver-Assisted Exposure

Once a caregiver understands the principles underlying exposure therapy, he or she can be taught how to assist with exposure exercises by serving as a coach. Some treatment outcome studies have indicated that involving close relatives in this way improves treatment effectiveness for anxiety disorders, as well as the interpersonal relationship (e.g., Belus, Baucom, & Abramowitz, 2014). However, caregiver-assisted exposure is optimally successful when conflict and accommodation within the relationship are minimal. By learning how to play the role of coach, the caregiver provides emotional support to the patient as he or she completes exposure practices within and outside of the therapy session. The caregiver is taught to provide gentle, but firm reminders

not to engage in avoidance or safety behaviors and rituals. Most important, the caregiver is trained to help the patient implement exposures correctly by making sure the feared stimulus is confronted in a way that tests fearful predictions. In the first exposure session, the caregiver and patient are introduced to four phases of confronting a stressor (described following) and how to communicate with each other at each phase.

An important aspect of this stage of treatment involves teaching the patient and caregiver two sets of communication skills. The first skill involves sharing thoughts and feelings, known as emotional expressiveness training, in which the dyad is taught to discuss with one another how they feel (as opposed to offering solutions) during exposure while also listening effectively to each other. This strategy helps the patient to focus on and confront distressing feels rather than avoiding them. The second skill involves learning how to make decisions as a team when it comes to planning and implementing exposure tasks and resisting safety behaviors (Epstein & Baucom, 2002). The actual process of confronting the fear stimulus—which can be broken down into the four stages of (a) discussing the exposure task, (b) confronting the feared situation, (c) dealing with elevated anxiety, and (d) evaluation—is discussed in further detail elsewhere (e.g., Abramowitz, Baucom, Wheaton, et al., 2013).

Reducing Accommodation

Outside of exposure therapy, clinicians can also intervene with the patient and caregiver regarding changing accommodation patterns that have become part of their everyday lives. In such interventions, the therapist begins by describing accommodation and its deleterious effects, noting that accommodation from the caregiver often is well intended. Next, an activity which has become hampered by anxiety symptoms is chosen, and the therapist facilitates a decision-making discussion regarding ways to handle this situation by relying on the principle of exposure, rather than relying on avoidance and safety cues or behaviors. For example, a caregiver might resume shopping at "contaminated" stores and using the various rooms in the house that had been off limits because of the patient's fears of spreading contamination. A mother might stop speaking up for her son with social anxiety or stop helping him avoid social interactions. The goal of these interventions is to work toward a life in which the patient with anxiety (and the caregiver) confronts the situations and stimuli that he or she has been avoiding and remains in that situation rather than using safety behaviors. Therefore, exposure becomes a way of life rather than just a defined exercise as a therapeutic assignment.

As treatment proceeds and exposure is successful, these gains often provide the patient and caregiver with new opportunities to engage with the world. Fear-based disorders "shrink" a patient's world (and perhaps a caregiver's world as well), limiting what they can do. Therapeutic gains mean that there are new opportunities for the patient and for the patient/caregiver team. To this end, the therapist can initiate a conversation noting that the patient and caregiver now have many opportunities to engage in life in new

ways that were previously hampered by the disorder. What would they like to do that would make life more rewarding and enriching that they have not been doing? In approaching treatment gains in this way, therapy is presented not only as alleviating distress but also as explicitly building opportunities for a more rewarding life. Such discussions can be helpful because often the pair develops limited routines in response to the disorder and, over time, stop thinking about alternative ways of behaving. Helping them make clear decisions about how they want to broaden their lives not only helps improve their quality of life but also builds exposure into their everyday lives on an ongoing basis, which can assist in maintenance of therapeutic gains after treatment is completed.

When discouraging a caregiver from accommodating to the patient's anxiety symptoms, it is important to understand what function the accommodation plays in the interpersonal relationship and address these issues. Accommodation might have become a major way that a spouse or parent shows care, concern, and love for his or her partner or child. Treatment can have iatrogenic effects to the extent that accommodation is removed but no replacement behaviors are offered (e.g., altering the relationship so that the individuals no longer feel as close to each other or the patient does not feel as loved by the caregiver). Consequently, it is important to discuss new and adaptive ways the pair would want to show their love, care, and concern for each other instead of having this dictated by the anxiety.

CONCLUSION

Although anxiety is typically viewed from the perspective of the individual with the problem, it exists in a social and interpersonal context. There are a myriad of ways that caregivers often inadvertently become a part of the anxiety process: helping the patient avoid anxiety-provoking situations, becoming safety cues, engaging in safety behaviors and compulsive rituals with or instead of the patient, and providing frequent reassurance. Whether out of concern for the patient or resulting from an attempt to avoid arguments about the problem with anxiety and fear, such behaviors from caregivers can unintentionally serve to maintain the anxiety. There is an almost universal desire of caregivers to be of assistance; but understandably, they do not typically come to therapy knowing how to help. Educating both parties about the treatment of anxiety, helping them understand the roles that each of them can take to be of assistance, and teaching them to work together as a team provides the opportunity to use the relationship as an important resource in the treatment of problems with clinical anxiety. From an interpersonal perspective, the fundamental efficacious intervention of exposure therapy remains the central focus of treatment, but it can be enhanced by an environment that helps to build a context for generalizing exposure to everyday life on an ongoing

basis. Research suggests that it is reasonable to expect that with the proper informed support of a caregiver in the patient's natural environment, treatment gains might well be enhanced and maintained more effectively over time.

REFERENCES

Abramowitz, J. S., Baucom, D. H., Boeding, S., Wheaton, M. G., Pukay-Martin, N. D., Fabricant, L. E., . . . Fischer, M. S. (2013). Treating obsessive-compulsive disorder in intimate relationships: A pilot study of couple-based cognitive-behavior therapy. *Behavior Therapy*, *44*, 395–407. http://dx.doi.org/10.1016/j.beth.2013.02.005

Abramowitz, J. S., Baucom, D. H., Wheaton, M. G., Boeding, S., Fabricant, L. E., Paprocki, C., & Fischer, M. S. (2013). Enhancing exposure and response prevention for OCD: A couple-based approach. *Behavior Modification*, *37*, 189–210. http://dx.doi.org/10.1177/0145445512444596

Abramowitz, J. S., Deacon, B. J., Olatunji, B. O., Wheaton, M. G., Berman, N. C., Losardo, D., . . . Hale, L. R. (2010). Assessment of obsessive-compulsive symptom dimensions: Development and evaluation of the Dimensional Obsessive-Compulsive Scale. *Psychological Assessment*, *22*, 180–198. http://dx.doi.org/10.1037/a0018260

Amir, N., Freshman, M., & Foa, E. B. (2000). Family distress and involvement in relatives of obsessive-compulsive disorder patients. *Journal of Anxiety Disorders*, *14*, 209–217. http://dx.doi.org/10.1016/S0887-6185(99)00032-8

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. Madison, CT: International Universities Press.

Belus, J. M., Baucom, D. H., & Abramowitz, J. S. (2014). The effect of a couple-based treatment for OCD on intimate partners. *Journal of Behavior Therapy and Experimental Psychiatry*, *45*, 484–488. http://dx.doi.org/10.1016/j.jbtep.2014.07.001

Bodden, D. H. M., Dirksen, C. D., Bögels, S. M., Nauta, M. H., De Haan, E., Ringrose, J., . . . Appelboom-Geerts, K. C. M. M. J. (2008). Costs and cost-effectiveness of family CBT versus individual CBT in clinically anxious children. *Clinical Child Psychology and Psychiatry*, *13*, 543–564. http://dx.doi.org/10.1177/1359104508090602

Boeding, S. E., Paprocki, C. M., Baucom, D. H., Abramowitz, J. S., Wheaton, M. G., Fabricant, L. E., & Fischer, M. S. (2013). Let me check that for you: Symptom accommodation in romantic partners of adults with obsessive-compulsive disorder. *Behaviour Research and Therapy*, *51*, 316–322. http://dx.doi.org/10.1016/j.brat.2013.03.002

Calvocoressi, L., Lewis, B., Harris, M., & Trufan, S. J. (1995). Family accommodation in obsessive-compulsive disorder. *The American Journal of Psychiatry*, *152*, 441–443.

Calvocoressi, L., Mazure, C. M., Kasl, S. V., Skolnick, J., Fisk, D., Vegso, S. J., . . . Price, L. H. (1999). Family accommodation of obsessive-compulsive symptoms: Instrument development and assessment of family behavior. *Journal of Nervous and Mental Disease*, *187*, 636–642. http://dx.doi.org/10.1097/00005053-199910000-00008

Caporino, N. E., Morgan, J., Beckstead, J., Phares, V., Murphy, T. K., & Storch, E. A. (2012). A structural equation analysis of family accommodation in pediatric obsessive-compulsive disorder. *Journal of Abnormal Child Psychology*, *40*, 133–143. http://dx.doi.org/10.1007/s10802-011-9549-8

Chambless, D. L., Bryan, A. D., Aiken, L. S., Steketee, G., & Hooley, J. M. (2001). Predicting expressed emotion: A study with families of obsessive-compulsive and agoraphobic outpatients. *Journal of Family Psychology*, *15*, 225–240. http://dx.doi.org/10.1037/0893-3200.15.2.225

Chambless, D. L., & Steketee, G. (1999). Expressed emotion and behavior therapy outcome: A prospective study with obsessive-compulsive and agoraphobic outpatients. *Journal of Consulting and Clinical Psychology*, *67*, 658–665. http://dx.doi.org/10.1037/0022-006X.67.5.658

Cole, J. D., & Kazarian, S. S. (1988). The Level of Expressed Emotion Scale: A new measure of expressed emotion. *Journal of Clinical Psychology*, *44*, 392–397. http://dx.doi.org/10.1002/1097-4679(198805)44:3<392::AID-JCLP2270440313>3.0.CO;2-3

Cosentino, T., Faraci, P., Coda, D., D'Angelo, R., De Pari, L. A., Di Crescenzo, M. R., . . . Scelza, A. (2015). Family accommodation in obsessive-compulsive disorder: A study on associated variables. *Clinical Neuropsychiatry: Journal of Treatment Evaluation*, *12*, 128–134.

Epstein, N. B., & Baucom, D. H. (2002). *Enhanced cognitive-behavioral therapy for couples: A contextual approach*. Washington, DC: American Psychological Association.

Fredman, S. J., Baucom, D. H., Miklowitz, D. J., & Stanton, S. E. (2008). Observed emotional involvement and overinvolvement in families of patients with bipolar disorder. *Journal of Family Psychology*, *22*, 71–79. http://dx.doi.org/10.1037/0893-3200.22.1.71

Funk, J. L., & Rogge, R. D. (2007). Testing the ruler with item response theory: Increasing precision of measurement for relationship satisfaction with the Couples Satisfaction Index. *Journal of Family Psychology*, *21*, 572–583. http://dx.doi.org/10.1037/0893-3200.21.4.572

Garcia, A. M., Sapyta, J. J., Moore, P. S., Freeman, J. B., Franklin, M. E., March, J. S., & Foa, E. B. (2010). Predictors and moderators of treatment outcome in the Pediatric Obsessive Compulsive Treatment Study (POTS I). *Journal of the American Academy of Child & Adolescent Psychiatry*, *49*, 1024–1033. http://dx.doi.org/10.1016/j.jaac.2010.06.013

Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., . . . Charney, D. S. (1989). The Yale–Brown Obsessive Compulsive Scale. *Archives of General Psychiatry*, *46*, 1006–1011. http://dx.doi.org/10.1001/archpsyc.1989.01810110048007

Hooley, J. M., & Teasdale, J. D. (1989). Predictors of relapse in unipolar depressives: Expressed emotion, marital distress, and perceived criticism. *Journal of Abnormal Psychology*, *98*, 229–235.

Lebowitz, E. R., Scharfstein, L., & Jones, J. (2015). Child-report of family accommodation in pediatric anxiety disorders: Comparison and integration with mother-report. *Child Psychiatry and Human Development*, *46*, 501–511. http://dx.doi.org/10.1007/s10578-014-0491-1

Lebowitz, E. R., Woolston, J., Bar-Haim, Y., Calvocoressi, L., Dauser, C., Warnick, E., . . . Leckman, J. F. (2013). Family accommodation in pediatric anxiety disorders. *Depression and Anxiety*, *30*(1), 47–54. http://dx.doi.org/10.1002/da.21998

Leff, J., & Vaughn, C. (1985). *Expressed emotion in families: Its significance for mental illness*. New York, NY: Guilford Press.

Marcaurelle, R., Bélanger, C., Marchand, A., Katerelos, T. E., & Mainguy, N. (2005). Marital predictors of symptom severity in panic disorder with agoraphobia. *Journal of Anxiety Disorders*, *19*, 211–232.

McCarthy, L., & Shean, G. (1996). Agoraphobia and interpersonal relationships. *Journal of Anxiety Disorders*, *10*, 477–487.

Merlo, L. J., Lehmkuhl, H. D., Geffken, G. R., & Storch, E. A. (2009). Decreased family accommodation associated with improved therapy outcome in pediatric obsessive-compulsive disorder. *Journal of Consulting and Clinical Psychology*, *77*, 355–360. http://dx.doi.org/10.1037/a0012652

Norman, K. R., Silverman, W. K., & Lebowitz, E. R. (2015). Family accommodation of child and adolescent anxiety: Mechanisms, assessment, and treatment. *Journal of Child and Adolescent Psychiatric Nursing*, *28*, 131–140.

Piacentini, J., Bergman, R. L., Chang, S., Langley, A., Peris, T., Wood, J. J., & McCracken, J. (2011). Controlled comparison of family cognitive behavioral therapy and psychoeducation/relaxation training for child obsessive-compulsive dis-

order. *Journal of the American Academy of Child & Adolescent Psychiatry*, *50*, 1149–1161. http://dx.doi.org/10.1016/j.jaac.2011.08.003

Pinto, A., Van Noppen, B., & Calvocoressi, L. (2013). Development and preliminary psychometric evaluation of a self-rated version of the Family Accommodation Scale for obsessive-compulsive disorder. *Journal of Obsessive-Compulsive and Related Disorders*, *2*, 457–465. http://dx.doi.org/10.1016/j.jocrd.2012.06.001

Spanier, G. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family*, *38*, 15–28. http://dx.doi.org/10.2307/350547

Thompson-Hollands, J., Kerns, C. E., Pincus, D. B., & Comer, J. S. (2014). Parental accommodation of child anxiety and related symptoms: Range, impact, and correlates. *Journal of Anxiety Disorders*, *28*, 765–773. http://dx.doi.org/10.1016/j.janxdis.2014.09.007

II

TREATMENT MECHANISMS

Introduction to Part II

Why Mechanisms of Change?

Jonathan S. Abramowitz and Shannon M. Blakey

The field of mental health has reached a point of maturity such that a multitude of psychological treatments are available for clinical anxiety. Many of these programs have empirical support and are associated with desirable emotional, behavioral, cognitive, social, educational, and occupational outcomes (e.g., Barlow, 2007). Such interventions, usually disseminated through treatment manuals developed and tested for specific disorders listed in the *Diagnostic and Statistical Manual of Mental Disorders* (fifth ed. [*DSM–5*]; American Psychiatric Association, 2013) and the *International Classification of Diseases* (11th ed. [ICD–11]; World Health Organization, 2018), typically include multiple components. Panic Control Treatment (Craske & Barlow, 2006), for example, is a program consisting of psychoeducation, cognitive therapy, and exposure therapy for panic disorder and agoraphobia. Coping Cat (Kendall & Hedtke, 2006), a cognitive behavior treatment program for anxious youth, similarly includes psychoeducation, cognitive restructuring, exposure exercises, somatic management, and problem-solving strategies. Numerous randomized controlled trials have been conducted with these and other manualized psychological treatments and consistently demonstrate that such treatments work. However, these studies do not necessarily address the mechanisms of change—*why* such treatments work. In multicomponent programs, it might not be clear which components are essential and which are less critical (or altogether unnecessary) for good outcomes.

The aim of Part II of this handbook is to help clinicians identify empirically supported mechanisms of change (and the procedures that activate them), as well as how to match them with the transdiagnostic anxious processes described in Part I. Drawing from Kazdin and Nock (2003; Kazdin, 2007), we define treatment mechanisms as the basis for the effectiveness of a treatment— the processes or reasons demonstrated to be responsible for the changes that

occur in therapy. We believe that capitalizing on mechanisms of change to target psychological maintenance processes (like those discussed in Part I) affords greater clinical precision than does the use of multicomponent treatment programs for disorders defined by the *DSM–5* and the ICD–11. The former approach allows the clinician to make the most patient-specific, evidence-based treatment decisions when the inevitable need to deviate from disorder-based treatment manuals arises. Critically, we are not advocating for an "eclectic" approach in which clinicians rely simply on clinical judgment and choose from assorted theoretical orientations (e.g., behavioral plus psychodynamic). Rather, we argue that following a thorough assessment and case conceptualization, an effective and efficient clinician will design an optimally tailored treatment plan using empirically supported procedures activating mechanisms of change—usually inspired by empirically supported treatment manuals—to target a patient's specific anxious processes.

In this introduction, we consider more specifically several reasons that clinicians are better off focusing on mechanisms of change, rather than rigidly following disorder-driven manualized treatment programs. We begin, however, with a brief case example of how early scientifically oriented clinicians derived empirically informed interventions for fear-based problems.

THE DEVELOPMENT OF AN EMPIRICALLY SUPPORTED INTERVENTION

Long considered a treatment-refractory condition by those espousing "talk" therapy (e.g., psychoanalysis), obsessive-compulsive disorder (OCD) was one of the first problems to be addressed by the behavior therapy movement in the 1950s and 1960s. Clinicians wishing to apply the principles of learning to what is now called OCD turned to Richard Solomon's (e.g., Solomon, Kamin, & Wynne, 1953) animal model of what was then termed *compulsive neurosis*. In this paradigm, dogs were taught to jump over a hurdle when a light was turned on to avoid an electric shock, which was paired with the light. After this avoidance response had been learned, the dogs persisted in becoming visually distressed when the light was illuminated, even after the electrical power supply to the dogs' cage had been cut off (i.e., no more shocks were administered). They continued to "superstitiously" or "ritualistically" jump over the hurdle to safety even though there was no longer a threat of shock. Thus, the dogs apparently acquired an obsessive-compulsive habit (jumping over the hurdle) that was maintained by negative reinforcement (the immediate reduction of emotional distress). The paradigm from Solomon and colleagues (1953) serves as an animal analogue to OCD in humans, where compulsive rituals are triggered by fear that is associated with situations or conditioned stimuli (e.g., toilets, floors, obsessional thoughts) that pose little or no risk of harm. The fear is then reduced by avoidance and compulsive rituals (e.g., washing), which are negatively reinforced over time because they serve as an escape from distress.

Solomon and his colleagues (1953) next attempted to "treat" the dogs' irrational ("compulsive") jumping behavior using various techniques, the most effective of which involved a combination of procedures now referred to as exposure and response prevention. Solomon and colleagues hypothesized that exposing the dogs to the conditioned stimulus (turning on the light) while simultaneously preventing the conditioned escape/avoidance response (increasing the heights of the hurdle so jumping was not possible) would eventually result in the extinction of fear. When these procedures were applied, the dogs first displayed a strong fear response (e.g., running around the chamber, jumping on the walls, defecating, yelping). Gradually, however, this behavior subsided as repeated and prolonged exposure and response prevention produced an extinction of the initial fear. When the height of the hurdle was lowered after several extinction trials, the dogs no longer felt compelled to jump when the light was turned on.

Once researchers like Meyer (1966) and Rachman and Hodgson (1980) recognized the functional parallels between humans with OCD and Solomon and colleagues' (1953) dogs, they began studying how systematic exposure and response prevention could be adapted for the treatment of OCD symptoms in humans. Patients with OCD with hand washing rituals were seated at a table with a container of dirt and miscellaneous compost. The experimenter, after placing his own hands in the mixture, asked the patient to do the same and explained that he or she would not be permitted to wash his or her hands for some length of time. When the patient began the procedure, an increase in anxiety, fear, and urges to wash his or her hands, was observed (as expected). However, as with the dogs in Solomon and colleagues' study, the patients eventually evidenced a *reduction* in fear and urge to wash with continued exposure and response prevention, demonstrating therapeutic extinction (Rachman, De Silva, & Röper, 1976). This procedure was repeated on subsequent days, the theory predicting that after some time, extinction would be complete and the OCD symptoms would be reduced.

This experimental work serves as the conceptual basis for the use of exposure and response prevention as a tandem of interventions for obsessions and compulsions—one of the major success stories in the treatment of a set of symptoms once considered highly complex and unresponsive to psychological therapies. Indeed, a large body of evidence indicates the efficacy of this approach to treatment (e.g., Olatunji, Davis, Powers, & Smits, 2013).

OF MANUALS AND MECHANISMS

The takeaway message from this case example for acting (and aspiring) clinicians is that in the absence of a treatment manual, the developers of exposure and response prevention drew from their knowledge of psychological principles to formulate a conceptualization of the clinical problem. They then applied experimentally established interventions to activate putative mechanisms of

action. This process of using knowledge of procedures and mechanisms to modify empirically established psychological processes (such as those described in the chapters of Part I of this handbook), however, has become a lost art in the era of the disorder-specific treatment manual. Several reasons that we believe the former approach is preferable to the latter are discussed next.

One Size Does Not Fit All

Manuals for specific *DSM–5* and ICD–11 disorders might be useful in treatment outcome studies that use carefully selected homogeneous patient samples with little comorbidity or complexity. Yet in most clinical settings, patients present with greater complexity, comorbid conditions, and heterogeneity than a treatment manual can address. Not only are *DSM–5* anxiety disorders highly comorbid with one another (Kessler, Chiu, Demler, & Walters, 2005), but clinical anxiety and fear are also common complaints outside of these anxiety disorders (e.g., youth with a learning disability often report significant testing anxiety). No therapy manual could adequately guide the treatment of anxiety across the infinite personal variations of the signs and symptoms of fear and anxiety. When a clinician's approach is grounded in (a) an understanding of the patient-specific processes that contribute to clinical anxiety, rather than simply assigning a diagnosis, and (b) knowledge of the mechanisms that address these maladaptive cognitive behavior processes, she can operate without the need for or dependence on disorder-based treatment manuals.

Optimize Efficiency

By understanding the mechanisms that account for therapeutic change, clinicians can better optimize treatment efficiency. "Should I spend more time using technique A or technique B with this patient?" Without knowing what is (and what is not) critical for effective treatment, a clinician risks focusing on superfluous procedures in multicomponent treatment packages, resulting in a lengthier and costlier course of therapy. The associated opportunity costs, unfortunately, can be high for patients—especially those with limited time, finances, and other resources available for treatment. As an example, eye movement desensitization and reprocessing (EMDR), which boasts rapid and dramatic reductions in the treatment of posttraumatic stress disorder (e.g., Shapiro, 1995), consists of exposing a patient to images of his or her trauma and inducing saccadic eye movements while focusing on sensory, physiological, and cognitive aspects of anxiety. Yet, studies comparing the complete EMDR package with EMDR in which the eye movements are omitted consistently find that the eye movements make no difference and are not essential to treatment efficacy (e.g., Devilly, Spence, & Rapee, 1998). The mechanism proposed for why the eye movements work lacks scientific basis (Hyer & Brandsma, 1997). Thus, the time spent on eye movement techniques in EMDR would be better used focusing on the other elements

of the therapy (e.g., imaginal exposure) that operate using mechanisms demonstrated to trigger change processes.

Identify Prognostic Factors

Understanding the mechanisms through which treatment techniques operate can help clinicians identify factors that should be considered when determining whether a patient is suitable for treatment (and if so, which specific techniques are more likely to be effective than others). If the correction of maladaptive cognitions (i.e., dysfunctional beliefs) via rational discussion is a key mechanism of change related to clinical anxiety, the clinician might pay particular attention to a patient's educational level, attributional style, and logical reasoning skills, as these will influence whether the patient is a good candidate for a particular treatment procedure that relies on these abilities (e.g., cognitive restructuring).

Ease Therapist Training

Focusing on ways to capitalize on transdiagnostic mechanisms of change also affords advantages over a manual-driven approach when it comes to clinical training. It is easier and more efficient to teach clinicians how to operate from a single transdiagnostic conceptual model than it is for clinicians to learn a multitude of different treatment manuals based on the *DSM–5* and ICD–11 for a variety of psychological conditions. This is especially the case with anxiety disorders, given that many treatment manuals share core components and procedures (e.g., in vivo exposure). In turn, clinicians can begin working with patients with anxiety sooner than they would if they had to be trained in several manualized treatments. This approach also facilitates dissemination from a practical and a financial standpoint. Obstacles to mastering the delivery of psychological treatment include the expenses, time, and great effort required for sufficient clinical training. After formal graduate training has ended, many clinicians lack the time or financial ability to pursue supplementary instruction or supervision (Gray, Elhai, & Schmidt, 2007). Fortunately, these barriers are attenuated by the transdiagnostic approach and its emphasis on using empirically derived procedures to target common psychological maintenance processes.

Overview of Part II

The topics covered in the chapters within this section were chosen on the basis of empirical support for their likely role as a mechanism of change during treatment for anxiety. Although additional work is needed before these processes can be definitively labeled mechanisms of change during anxiety treatment (Kazdin, 2007; Kazdin & Nock, 2003), each process addressed in Part II of this handbook has a consistent body of research pointing toward its statistically accounting for reductions in clinical anxiety and a strong conceptual backdrop for how the process likely explains why reductions in anxiety occurred.

Although there is natural overlap among the change mechanisms (readers will note conceptual intersection between them), we believe that each change mechanism is sufficiently unique in how it is implemented and how it addresses maladaptive anxiety-related processes.

These chapters are not intended to be stand-alone manuals for implementation strategies that act on each purported mechanism of change. Indeed, entire volumes have been written on the science and art of the techniques aimed to capitalize on many of these processes (e.g., Abramowitz, Deacon, & Whiteside, 2019; Beck, 1976; Hayes, Strosahl, & Wilson, 1999). Rather, the chapters here are meant to provide a conceptual overview and some basic instruction so that the reader can develop an understanding of how the potential mechanism of change can be activated (and assessed) during cognitive behavior treatment for clinical anxiety. Readers interested in seeking more detailed guidance on the specifics of how to implement therapeutic interventions should reference other resources devoted to such interventions, several of which are cited in the chapters that follow.

Each chapter in Part II follows a general format in which the purported mechanism of change is first defined and described. Next, authors discuss how to implement interventions that capitalize on this process during treatment for anxiety. Third, each chapter addresses ways to observe and measure activation of the relevant mechanism in anxiety patients. Each chapter also contains a brief review of research supporting the efficacy of the hypothesized mechanism of change. Finally, authors describe contraindications and patient-specific considerations when using treatment methods that capitalize on each mechanism of change. Because many readers are accustomed to thinking in terms of *DSM–5* and ICD–11 diagnoses, the mechanisms of change described in these chapters are also linked back to these classifications. We hope that these practical chapters will help readers evolve from a focus on multicomponent treatment manuals for "mental disorders" to a more conceptually oriented approach in which decisions about how to intervene are made at the level of mechanisms that change psychological processes.

REFERENCES

Abramowitz, J. S., Deacon, B. J., & Whiteside, S. P. H. (2019). *Exposure therapy for anxiety: Principles and practice* (2nd ed.). New York, NY: Guilford Press.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Barlow, D. H. (2007). *Clinical handbook of psychological disorders: A step-by-step treatment manual* (4th ed.). New York, NY: Guilford Press.

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. Madison, CT: International Universities Press.

Craske, M. G., & Barlow, D. H. (2006). *Mastery of your anxiety and panic*. Oxford, England: Oxford University Press.

Devilly, G. J., Spence, S. H., & Rapee, R. M. (1998). Statistical and reliable change with eye movement desensitization and reprocessing: Treating trauma within a veteran population. *Behavior Therapy*, *29*, 435–455. http://dx.doi.org/10.1016/S0005-7894(98)80042-7

Gray, M. J., Elhai, J. D., & Schmidt, L. O. (2007). Trauma professionals' attitudes toward and utilization of evidence-based practices. *Behavior Modification*, *31*, 732–748. http://dx.doi.org/10.1177/0145445507302877

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York, NY: Guilford Press.

Hyer, L., & Brandsma, J. M. (1997). EMDR minus eye movements equals good psychotherapy. *Journal of Traumatic Stress*, *10*, 515–522. http://dx.doi.org/10.1002/jts.2490100314

Kazdin, A. E. (2007). Mediators and mechanisms of change in psychotherapy research. *Annual Review of Clinical Psychology*, *3*, 1–27. http://dx.doi.org/10.1146/annurev.clinpsy.3.022806.091432

Kazdin, A. E., & Nock, M. K. (2003). Delineating mechanisms of change in child and adolescent therapy: Methodological issues and research recommendations. *Journal of Child Psychology and Psychiatry*, *44*, 1116–1129. http://dx.doi.org/10.1111/1469-7610.00195

Kendall, P. C., & Hedtke, K. A. (2006). *Cognitive-behavioral therapy for anxious youth: Therapist manual* (3rd ed.). Ardmore, PA: Workbook.

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month *DSM–IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 617–627. http://dx.doi.org/10.1001/archpsyc.62.6.617

Meyer, V. (1966). Modification of expectations in cases with obsessional rituals. *Behaviour Research and Therapy*, *4*, 273–280. http://dx.doi.org/10.1016/0005-7967(66)90023-4

Olatunji, B. O., Davis, M. L., Powers, M. B., & Smits, J. A. J. (2013). Cognitive-behavioral therapy for obsessive-compulsive disorder: A meta-analysis of treatment outcome and moderators. *Journal of Psychiatric Research*, *47*, 33–41. http://dx.doi.org/10.1016/j.jpsychires.2012.08.020

Rachman, S., De Silva, P., & Röper, G. (1976). The spontaneous decay of compulsive urges. *Behaviour Research and Therapy*, *14*, 445–453. http://dx.doi.org/10.1016/0005-7967(76)90091-7

Rachman, S. J., & Hodgson, R. J. (1980). *Obsessions and compulsions*. Englewood Cliffs, NJ: Prentice-Hall.

Shapiro, F. (1995). *Eye movement desensitization and reprocessing: Basic principles, protocols, and procedures*. New York, NY: Guilford Press.

Solomon, R. L., Kamin, L. J., & Wynne, L. C. (1953). Traumatic avoidance learning: The outcomes of several extinction procedures with dogs. *The Journal of Abnormal and Social Psychology*, *48*, 291–302. http://dx.doi.org/10.1037/h0058943

World Health Organization. (2018). *International classification of diseases* (11th ed.). Geneva, Switzerland: Author.

14

Habituation

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Habituation refers to the natural reduction in anxiety over the course of exposure therapy as a result of repeated and prolonged confrontation with feared stimuli. It is considered one mechanism of change within exposure therapy (e.g., Abramowitz, Deacon, & Whiteside, 2019). Clinical anxiety (e.g., anxiety and related disorders as defined in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*; American Psychiatric Association, 2013) is characterized by insufficient inhibition of fear in objectively safe situations. Knowledge of the mechanisms behind fear acquisition and inhibition is vital for understanding how to best intervene in cases of clinical anxiety. Fear acquisition can be understood using a Pavlovian fear conditioning model (Pavlov, 1927) in which an innocuous or neutral stimulus is paired with an innately aversive unconditioned stimulus, resulting in the previously neutral stimulus eliciting a conditioned fear response (now a conditioned stimulus). Fear inhibition is studied via a procedure in which the participant is repeatedly exposed to a conditioned stimulus in the absence of the aversive unconditioned stimulus, resulting in a decrease in conditioned fear response. This is known as *fear extinction* (e.g., Myers & Davis, 2007), and there is evidence that such extinction occurs in part because of the process of habituation (the natural decrease in fear responding to a fear-related stimulus

when such a stimulus is presented in a repeated and/or prolonged manner; McSweeney & Swindell, 2002).

Early theories of extinction conceptualized this process as representing *unlearning* or *erasing* of previously conditioned fear; however, subsequent empirical investigation has not fully supported this conceptualization. For example, conditioned fear responses can return following extinction training (e.g., Craske & Mystkowski, 2006). A contemporary conceptualization emphasizes inhibitory learning, such that the fear association is not "unlearned" but rather remains intact, and inhibitory associations form in contrast to the conditioned fear association (Myers & Davis, 2007). In other words, the original fear (i.e., conditioned stimulus) is not erased during extinction but rather gains a new inhibitory meaning to the individual. It is important to note that habituation, although highly relevant to extinction, does not provide a complete explanation for this process, which likely occurs through multiple mechanisms. This chapter focuses on habituation as a mechanism of change that occurs during repeated and prolonged exposure therapy (Cooper, Clifton, & Feeny, 2017). For information related to inhibitory processes in extinction, see Chapter 15 of this handbook.

Exposure therapy involves repeated confrontation with feared, but objectively safe, situations or stimuli in a systematic and often gradual manner. This intervention has strong empirical evidence as an effective intervention for clinically severe fear and anxiety (Deacon & Abramowitz, 2004; Hofmann & Smits, 2008; Kaczkurkin & Foa, 2015). Exposure therapy is based in part on emotional processing theory, which conceptualizes the *fear structure* as a cognitive network of representations of fear stimuli, fear responses, and stimulus-response meaning (Foa, Huppert, & Cahill, 2006; Foa & Kozak, 1986). The maladaptive fear structures that underlie clinically severe anxiety differ from more adaptive fear structures in that they involve excessive response elements that do not reflect reality. They also contain pathological meaning and inaccurate or unhelpful interpretations. For example, a survivor of sexual assault whose assailant was a man with red hair may perceive all red-haired men as dangerous and experience an excessive fear response whenever she interacts with any man with red hair. Additionally, she may experience pathological meaning elements like believing she is to blame for the assault or the world is unsafe. Exposure therapy involves activating the fear structure and receiving incompatible information that is subsequently integrated into the fear structure.

Habituation occurs when the strength of the fear response decreases over repeated exposure trials, as depicted in Figure 14.1. This decreased fear response to previously feared objects or situations represents incompatible information that is incorporated to make the fear structure more adaptive. Anxiety reduction over repeated exposures may also disconfirm pathological meaning elements (e.g., experiencing anxiety is dangerous, anxiety will never decrease) and provide evidence of mastery and competence.

FIGURE 14.1. Habituation of Anxiety Over Time During Four Exposure Trials Using the Same Stimulus
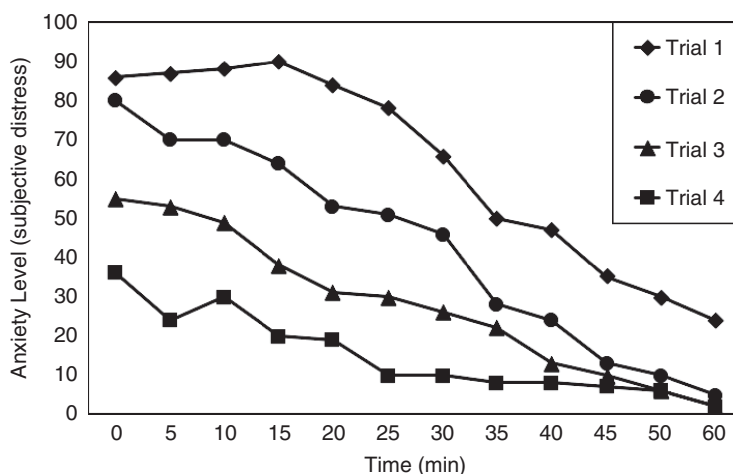
IMPLEMENTATION

Exposure can occur in different formats depending on the nature and specific presentations of clinical anxiety and fear, including (a) in vivo exposure, which entails confronting feared objects or situations (e.g., a spider) in real life; (b) imaginal exposure, which entails confronting mental stimuli (e.g., unwanted thoughts, images, memories of traumatic events); (c) interoceptive exposure, which entails confronting feared internal body sensations (e.g., racing heart, breathlessness); and (d) virtual reality–based exposure, which entails confronting feared situations and stimuli using an interactive computer generated environment (e.g., a theatre of war or combat). The type of exposure used is determined by the patient's presentation of fear, and many treatment approaches use multiple types of exposures.

Exposure for Different Presentations of Anxiety

Although the specific stimuli used in exposure necessarily varies across different presentations of fear and anxiety, the general process of implementing exposure is similar. For specific phobias, which involve excessive fear or anxiety about a circumscribed object or situation, exposure typically involves direct exposures to the feared stimulus, often in a gradual manner (e.g., Craske, Antony, & Barlow, 1997). For example, a child with a phobia of dogs may begin by confronting a toy dog, then watch a video of an actual dog, and gradually increase the intensity of exposures until he or she interacts with an actual dog. In vivo exposure for specific phobia may be conducted across multiple sessions, or in a single multiple-hour massed session.

When treating panic attacks, which involve fear in response to arousal-related body sensations, exposure typically involves confrontation with internal cues via interoceptive exposure. Such cues may be generated through exercises like hyperventilation or spinning in a swivel chair, which provoke sensations like those of a panic attack (e.g., racing heart, shortness of breath, dizziness; Barlow & Craske, 1994; Clark, 1986). When agoraphobia—the fear of not being able to escape from a situation in which one experiences panic—is part of the clinical picture, in vivo exposure to feared stimulations may be used in addition to interoceptive exposure. In social anxiety—the fear of embarrassment or scrutiny, often accompanied by fears that others will react negatively to the observable signs of anxiety (e.g., muscle tension, sweating)—exposure may involve facing feared social interactions via in vivo exposure while simultaneously performing interoceptive exposure to the very bodily sensations that the patient fears might be noticed by others (e.g., Ledley, Foa, & Huppert, 2005).

Obsessive-compulsive disorder (OCD)—fear provoked by recurrent distressing (obsessional) thoughts and images, often triggered by external stimuli and repetitive mental or behavioral acts (compulsions)—is addressed using exposure and response prevention, in which exposures are coupled with the patient refraining from compulsive rituals (e.g., Foa, Steketee, Grayson, Turner, & Latimer, 1984). Exposure is often conducted in vivo because obsessional fear is typically triggered by objects or situations in the environment (e.g., toilets) or situations of increased responsibility (e.g., being the last to leave the house and responsible for locking the door). In addition, exposure for OCD often necessitates imaginal exposure to the feared obsessional thoughts, images, and ideas of negative outcomes (e.g., thoughts of becoming ill from "toilet germs," images of burglaries because of forgetting to lock the door). Interventions for severe anxiety related to illness similarly involve in vivo exposure (e.g., hospitals, reading about diseases) and imaginal exposure (e.g., imagining having a serious illness), sometimes accompanied by interoceptive exposure to bodily sensations that are misinterpreted as indications of ill health (e.g., headache, sweating, tachycardia).

Finally, posttraumatic stress disorder (PTSD)—fear provoked by memories of a traumatic event and trauma-related external stimuli—is treated using in vivo exposure (e.g., feared but safe reminders of the event) and imaginal exposure (e.g., recounting memories of the trauma itself; Jonas et al., 2013). If fears of arousal-related body sensations are also part of the clinical picture, interoceptive exposure may also be appropriate.

Optimizing Habituation During Exposure Therapy

A completed description of how to implement exposure therapy is beyond the scope of this chapter—there are entire books dedicated to this topic (e.g., Abramowitz et al., 2019). Accordingly, this section highlights ways to implement exposure to capitalize on habituation.

Information-Gathering and Treatment Rationale

A course of exposure therapy typically begins with an assessment of (a) external and internal fear cues, (b) the perceived feared consequences of encountering such cues (e.g., "I will be horribly embarrassed if I speak up in class"), and (c) the strategies used to reduce anxiety by avoiding and escaping from these triggers (e.g., safety behaviors). The therapist provides a clear rationale for using exposure, which helps to motivate the patient to tolerate the initial distress that typically accompanies exposure exercises until habituation occurs. This rationale incorporates a clear conceptual model of the anxiety problem, as well as what it will be like to engage in exposure therapy, including the provocation and diminution of anxiety during exposure. It can be helpful to use metaphors to describe the exposure and habituation process, like asking the patient to imagine watching the same scary movie several times in a row and asking him or her how it may feel at the first viewing compared with a fifth (or subsequent) viewing. This provides a straightforward and relatable example of how habituation to fear-related stimuli occurs over repeated exposures. It is also important to check for understanding to ensure that the patient has a solid grasp of why exposure is an effective intervention and how an effective exposure trial should be conducted. This maximizes the chances of subsequently conducting effective and therapeutic exposures.

In addition, the preparatory stage of exposure introduces the patient to the importance of reducing (if not eliminating) subtle and not-so-subtle avoidance, escape strategies, and other safety cues that prevent the natural extinction of fear (i.e., response prevention). Depending on the nature of the patient's anxiety problem and the type of anxiety-reduction strategies he or she uses, response prevention may take different forms. Individuals with OCD who engage in compulsive rituals are taught to abstain from such ritualizing, and individuals with panic attacks who insist a "safe person" accompany them outside the home are helped to reduce reliance on such caregivers.

Hierarchy Development

Exposure therapy to bring about habituation typically involves constructing a fear hierarchy—a list of to-be-confronted feared situations and stimuli. The hierarchy is generated from the information gleaned from the assessment of fear cues, and this process is a collaborative effort that involves input from the therapist and the patient. The patient rates how distressing exposure to each item would be, and then items on the hierarchy are arranged from least to most distressing. The therapist and then patient then agree on a plan for conducting and repeating the exposures within the hierarchy, usually graduating from the least to the most fear-provoking.

Implementing Exposure

When deciding on the first exposure for the patient, it can be helpful for the therapist to consider which item can feasibly be repeated multiple times and would provide the strongest opportunity for habituation. Exposure often

begins with confronting moderately distressing stimuli on the hierarchy and gradually working up to more difficult situations. An early successful experience with anxiety reduction during an exposure can reinforce the treatment rationale and give the patient an experience of mastery and increased motivation toward completing additional exposures. For example, a child with a fear of the dark can be helped to confront increasingly less illuminated rooms with the final exposure leaving the child alone in a completely dark room. Exposures conducted in the session with the therapist's supervision are then repeated by the patient between sessions as "homework" assignments.

To capitalize on habituation, the patient is instructed to remain in the situation or to engage with the feared stimulus long enough for him or her to observe that his or her distress has decreased substantially. To measure habituation over time during the exposure session, the therapist asks the patient to provide a subjective rating of their current anxiety or distress level (e.g., on a scale from 0 to 10 or from 0 to 100) before exposure, at various increments during exposure (e.g., every 5 minutes), and after exposure using the subjective units of distress scale (SUDS) or an "anxiety thermometer." This can be helpful information for titrating the exposure to ensure sufficient fear activation and for monitoring anxiety reduction across the course of treatment. Two types of habituation may be observed: anxiety that declines from the beginning to the end of an individual exposure trial (i.e., within-session habituation) and anxiety that declines over repeated occasions of exposure and is the basis of more long-term learning (i.e., between-session habituation). Another consideration is that extinction learning is context dependent (Bouton, 2004); therefore, after habituation occurs in one context, it can be helpful to conduct the exposure in different contexts to promote generalization of learning.

For example, during prolonged exposure therapy for PTSD (Foa & Rothbaum, 1998), the patient should remain in exposure until his or her SUDS rating decreases to 50% of its peak rating or until the patient has remained exposed for at least 30 minutes to 45 minutes. However, these are general guidelines and individual patient experiences during exposures vary. Accordingly, the therapist should note what occurs during exposure and tailor such guidelines to each specific patient. Some patients require additional time because of difficulties experiencing habituation, and the therapist may consider instructing these patients to stay in the exposure for a longer duration of time (e.g., 60 minutes) or to engage in more frequent exposures (e.g., repetitions of the trauma narrative).

The relationship between within-session habituation and symptom reduction is inconsistent in the empirical literature (e.g., van Minnen & Foa, 2006). In fact, recent research suggests that change in SUDS during imaginal exposure sessions for PTSD is not related to overall treatment response (e.g., Sripada & Rauch, 2015); as such, a lack of within-session habituation need not be concerning and may even represent appropriate emotional engagement with the exposure. It is recommended that the therapist monitor SUDS ratings

within and between sessions, because whether habituation does or does not occur within session can be a helpful learning experience. For example, if the patient does experience habituation, the therapist and the patient can reflect on the fact that when the patient confronted feared stimuli, anxiety decreased. If habituation does not occur within the session, the therapist can reinforce new learning, teaching the patient that he or she can be anxious and do it anyway, is capable of dealing with his or her anxiety, or does not actually lose control or go crazy when he or she is anxious.

Conversely, between-session habituation has been shown to be a predictor of treatment response (Gallagher & Resick, 2012; Jaycox, Foa, & Morral, 1998; Kozak, Foa, & Steketee, 1988; Rauch, Foa, Furr, & Filip, 2004; Sripada & Rauch, 2015; Telch et al., 2004; van den Hout, van der Molen, Griez, Lousberg, & Nansen, 1987; van Minnen & Foa, 2006; van Minnen & Hagenaars, 2002), and monitoring SUDS ratings across exposure sessions is also important. If a patient is not demonstrating habituation across exposure sessions, the therapist may consider whether the patient is persisting with individual exposure trials long enough for anxiety reduction to occur. Additionally, it might be that the patient is engaging in cognitive or behavioral avoidance during exposures conducted outside of the session.

Ensuring Proper Engagement With Exposure Stimuli

It is important to monitor the patient's level of engagement with the fear stimulus to ensure appropriate activation of fear. *Underengagement* refers to too little fear activation during exposure, whereas *overengagement* refers to too much fear activation (Hembree, Rauch, & Foa, 2003). Engagement can be assessed via the patient's subjective report of fear and anxiety during exposure (i.e., SUDs ratings), as well as his or her overt behavior (e.g., efforts to avoid fear). Given the natural tendency to avoid fear-related stimuli, underengagement is more likely to be observed than overengagement. Accordingly, the therapist can actively encourage emotional engagement as well as structure exposure trials to optimize the emotional salience of the fear stimulus. For the patient, this may mean (a) ensuring that the most feared elements of the hierarchy item are confronted, (b) adding additional fear related stimuli, or (c) incorporating stimuli from a greater number of sensory modalities (e.g., vibrations, smells in virtual reality exposure). In imaginal exposure, this may include prompting for details that the patient may be omitting because of fear. It may also include making sure the patient is not engaging in distraction (Telch et al., 2004).

The patient may use cognitive strategies to avoid or underengage, like using distraction during in vivo exposure or reminding themselves that a virtual reality-based exposure is not real. If the patient appears to be experiencing a lack of fear activation, the therapist can query about the patient's internal experience and what he or she is saying to himself or herself during the exposure. The patient may also engage in behavioral avoidance strategies during exposures, including the use of safety behaviors and safety

cues. These are important considerations when maximizing habituation because safety behaviors and cues undermine activation of the fear response, impeding the opportunity to experience anxiety reduction across repeated exposures.

Similarly, it is important that the patients not use other types of "coping strategies" (e.g., deep breathing, other relaxation techniques) during exposure. Such techniques, although potentially useful for coping with day-to-day life stress, prevent optimal activation of the fear structure and prevent the opportunity for habituation. Discussing the problems with using such coping strategies early in the treatment process can help the therapist anticipate what coping behaviors to look for that may impact the patient's emotional engagement and opportunities to experience habituation.

Although overengagement is a less common phenomenon, it can prevent habituation and processing of newly learned information. Overengagement may involve dissociation during the exposure, which attenuates opportunities for habituation. If dissociation occurs, the therapist can be a supportive presence while helping the patient stay grounded, such as by asking the patient to touch their chair or some other object in the room. It might be necessary to titrate exposures, like incorporating fewer elements of the patient's fear structure during an in vivo exposure, or having the patient keep their eyes open during imaginal exposure. Even with titration, exposure should proceed in a manner that allows for emotional engagement and conveys the therapist's confidence in the patient's ability to endure temporary anxiety and complete in the exposure. The therapist's goal should be to pull back the intensity of the exposure only as much as is necessary. One suggestion is to try changing one element at a time; for example, asking a patient with PTSD to open his or her eyes and look at a spot on the wall while still revisiting a traumatic memory verbally. If the patient remains overengaged, the therapist might consider asking the patient to write out a section of the memory instead of recounting it verbally.

Including Caregivers in Exposure Therapy

For various reasons, it might be beneficial to include a partner, parent, or other family member in exposure sessions (e.g., if the patient needs assistance completing exposures outside the therapist's office). Doing so helps create an "exposure-based lifestyle" (Cassiday, 2015, p. 95) and acknowledges the pivotal role played by the family environment in maintaining clinical anxiety, as well as in reinforcing a therapeutic approach-oriented behavioral style. In such instances, it is important to review with family members the rationale for exposure so that they are prepared for tolerating and supporting the patient's emotional activation during exposure sessions. Indeed, observing a child or partner/spouse face their fears and experience high levels of anxiety and distress—even if temporary and harmless—can be extremely uncomfortable for some family members.

OUTCOME INDICATORS

Measuring Habituation of Fear

Habituation is measured by several different approaches, including the use of subjective ratings, psychophysiological measurement, and clinical symptom tracking. The following section describes how to implement these approaches.

SUDS

A habituation-focused approach toward exposure therapy emphasizes the level of fear reduction during exposure as an important aspect of clinical change. As such, the patient's subjective report of anxiety or distress during exposures is an important way to assess this process. A common metric, as described previously, is the SUDS rating, in which the patient rates his or her moment-to-moment level of anxiety or distress on a scale from 0 to 10 or from 0 to 100. To assess within-session habituation, the decrease in SUDS during the exposure trial is considered. To assess between-session habituation, the decrease in SUDS between therapy sessions is considered. Although the peak SUDS level within each exposure session is most commonly used, some authors have suggested focusing on the average SUDS reported across each session (Bluett, Zoellner, & Feeny, 2014). Some exposure protocols suggest asking the patient for a SUDS rating every 5 minutes during an exposure (Foa & Rothbaum, 1998) and then obtaining a final rating at the end of the exposure, whereas other programs vary the interval between SUDS ratings.

Psychophysiological Indices

Habituation can also be measured using physiological indices. Given that the habituation process involves first activating a fear response, a psychophysiological assessment can be used to obtain objective markers of fear responding or activation. Common physiological indicators include heart rate and skin conductance, and these indicators allow for the opportunity to match a more objective measure with the very subjective self-reported SUDS ratings. An early investigation assessed heart rate and skin conductance during prolonged exposure for patients with specific phobia and found evidence that habituation as assessed using these physiological markers occurred more quickly than habituation as reported using SUDS (Watson, Gaind, & Marks, 1972). Moreover, habituation as measured by the physiological indices was more strongly associated with clinical improvement. Recent advances in the assessment of heart rate and skin conductance allow for real time monitoring and feedback during all phases of exposure trials. Accordingly, the patient and therapist can observe skin conductance and heart responses while the patient approaches feared stimuli (e.g., using a sensor attached to two fingers with an interface viewed using a tablet or iPad). Such calibration of the patient's verbal reports of negative affect can be a therapeutic intervention in itself by helping patients change maladaptive all-or-none perceptions of negative affect to a more useful continuum view.

Clinical Symptoms

The impact of exposure therapy and habituation on clinical symptoms can be measured using standard reliable and valid self-report and clinical interview measures relevant to the specific fear- or anxiety-related disorder. Physiological assessment has also been used as an outcome for exposure therapy for anxiety disorders. A recent trial of prolonged exposure for PTSD measured cortisol reactivity and startle response to fear stimuli immediately before and after exposure therapy as markers of treatment response (Rothbaum et al., 2014). Other studies use behavioral approach tests (BATs) to assess the effects of exposure for specific phobias (e.g., Sloan & Telch, 2002). BATs involve a series of tasks in which the patient gradually approaches a feared object. The patient's score on a BAT is associated with how close he or she can get to the feared stimulus in question; SUDS and physiological response (e.g., skin conductance, heart rate, galvanic skin response) might also be measured during these tasks. The use of a BAT can be helpful in monitoring a patient's progress in an objective, observable manner as the degree of approach can be compared from the beginning of treatment to after exposures have been completed.

EMPIRICAL SUPPORT

The association between within-session habituation and treatment response has not received strong support in the empirical literature, as the former is often not significantly correlated with treatment outcome (e.g., Baker et al., 2010; Craske et al., 2008; van Minnen & Foa, 2006). Several studies, however, suggest that between-session habituation, or a greater reduction in self-reported distress across exposure trials, is more strongly related to clinical improvement. This association has been identified across many studies investigating exposure for PTSD. In a sample of female assault victims receiving prolonged exposure, analysis of the average distress levels across six exposure sessions identified a group of patients for whom high initial engagement and gradual habituation was associated with greater symptom improvement compared with two other groups who did not demonstrate habituation across exposure sessions (Jaycox et al., 1998). In a sample of female assault survivors receiving exposure for chronic PTSD, SUDS ratings decreased with repeated exposure, and greater reductions between the first and last exposure session were associated with better treatment outcomes (Rauch et al., 2004). This association between SUDS reduction across exposure sessions and improved PTSD treatment response was replicated in another sample of female sexual assault survivors with PTSD (Gallagher & Resick, 2012). In a further study of trauma survivors, patients who responded to exposure therapy evidenced greater between-session habituation, and habituation between the first and second exposure sessions was significantly associated with improved treatment outcome (van Minnen & Hagenaars, 2002). Hierarchical linear modeling using SUDS rating within imaginal exposure sessions found that treatment

responders demonstrated greater between-session habituation than did non-responders, but there was no difference regarding within-session habituation (Sripada & Rauch, 2015). Notably, within-session habituation shows a pattern of slight increase which was unrelated to treatment outcome, suggesting that maintaining a sustained level of fear activation during an individual exposure represents appropriate activation and engagement.

Several studies have also provided evidence that between-session habituation is related to the beneficial effects of exposure therapy for anxiety disorders other than PTSD. For example, in a sample of patients with OCD, self-reported distress and physiological indicators (i.e., heart rate and skin conductance) during exposures showed habituation across 15 sessions of exposure, and greater between-session habituation was associated with greater treatment response (Kozak et al., 1988). It is important to note, however, that other studies suggest successful treatment outcomes can occur in the absence of between-session habituation (e.g., Lang & Craske, 2000; Pitman et al., 1996; Rowe & Craske, 1998; see Craske et al., 2008, for a review). For example, in a study of PTSD patients who received exposure therapy, 64.7% of the sample did not demonstrate a reliable change in SUDS during imaginal exposures, yet they still received treatment benefit (Bluett et al., 2014). Therefore, between-session habituation might be a helpful, but not necessary, condition for exposures to be effective in promoting recovery for anxiety-related disorders.

TROUBLESHOOTING

In contrast to the tenets of the emotional processing theory of exposure (e.g., Foa & Kozak, 1986), research indicates that anxiety reduction during exposure is not a reliable predictor of treatment outcome (see Craske et al., 2008). Moreover, clinicians should be aware that overreliance on habituation as an indicator of improvement during exposure could have unintended negative consequences. Emphasizing the importance of fear reduction during exposure implies that anxiety itself is inherently bad and that treatment is only successful if the patient's anxiety has declined within or between sessions. This may perpetuate a "fear of fear" mind-set and lead the patient to interpret inevitable (and normal) unexpected surges of fear (either within or outside of exposure trials) as signs of failure (e.g., Jacoby & Abramowitz, 2016). Anxious patients conducting exposure from within a habituation model might also use exposures to control their anxiety, approaching treatment with a mind-set such as, "I know I can do this exposure because my anxiety will come down." Such a posture is contrary to the aim of confronting fear cues and learning that anxiety and fear are normal and nonthreatening experiences. Although decades of success with exposure from an emotional processing theory perspective are well-documented (Abramowitz et al., 2019), the treatment literature speaks primarily to relatively short-term outcomes (e.g., Olatunji,

Davis, Powers, & Smits, 2013). Therefore, relatively little is known about the extent to which emphasizing fear reduction attenuates longer term retention of treatment gains.

It is also important to consider a patient's willingness and readiness to directly evoke negative affective states to produce habituation of fear. Although clinicians often inappropriately exclude patients from exposure because of mistaken beliefs about the risks of inducing (vs. minimizing) anxiety in-session (e.g., Meyer, Farrell, Kemp, Blakey, & Deacon, 2014), research does indicate that exposure may not be appropriate for patients with certain comorbid symptoms (e.g., severe suicidality, self-injurious behaviors, homicidality, active psychosis; Foa, Hembree, & Rothbaum, 2007). However, it is important to note that overall evidence suggests that exposure-based treatments can be used safely and effectively with many comorbidities (van Minnen, Harned, Zoellner, & Mills, 2012), and in cases with more severe comorbidity concurrent treatment may be ideal (e.g., co-occurring anxiety and substance abuse; Mills et al., 2012). In other situations, exposure might be most effective if delivered after co-occurring symptoms are addressed (e.g., de Bont, van Minnen, & de Jongh, 2013; Frueh et al., 2009).

CONCLUSION

Habituation, or the reduction in fear response over repeated exposures, remains a key potential mechanism of change in exposure therapy for clinical anxiety. While implementing exposures, it is important to ensure appropriate engagement with exposure stimuli, monitor subjective ratings of fear during and across repeated exposures, decrease use of cognitive and behavioral avoidance strategies, and structure exposures with regards to length and stimuli to maximize chances of habituation. The association between within-session habituation and treatment response has not received strong support in the empirical literature, suggesting that habituation within a single exposure is not necessary for clinical improvement. Whereas closely intertwined with extinction, between-session habituation, or greater reductions in distress across exposure trials, is more consistently related to clinical improvement. This suggests that anxiety reduction across exposures is an important mechanism to monitor during exposure therapy.

REFERENCES

Abramowitz, J. S., Deacon, B. J., & Whiteside, S. P. H. (2019). *Exposure therapy for anxiety: Principles and practice* (2nd ed.). New York, NY: Guilford Press.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders, fifth edition*. Washington, DC: Author.

Baker, A., Mystkowski, J., Culver, N., Yi, R., Mortazavi, A., & Craske, M. G. (2010). Does habituation matter? Emotional processing theory and exposure therapy for acrophobia. *Behaviour Research and Therapy, 48*, 1139–1143. http://dx.doi.org/10.1016/j.brat.2010.07.009

Barlow, D., & Craske, M. (1994). *Mastery of your anxiety and panic*. San Antonio, TX: The Psychological Corporation.

Bluett, E. J., Zoellner, L. A., & Feeny, N. C. (2014). Does change in distress matter? Mechanisms of change in prolonged exposure for PTSD. *Journal of Behavior Therapy and Experimental Psychiatry*, *45*, 97–104. http://dx.doi.org/10.1016/j.jbtep.2013.09.003

Bouton, M. E. (2004). Context and behavioral processes in extinction. *Learning & Memory*, *11*, 485–494. http://dx.doi.org/10.1101/lm.78804

Cassiday, K. L. (2015). Involving the family in treatment. In K. Ressler, D. S. Pine, & B. O. Rothbaum (Eds.), *Anxiety disorders: Translational perspectives on diagnosis and treatment* (pp. 95–104). New York, NY: Oxford University Press. http://dx.doi.org/10.1093/med/9780199395125.003.0007

Clark, D. M. (1986). A cognitive approach to panic. *Behaviour Research and Therapy*, *24*, 461–470. http://dx.doi.org/10.1016/0005-7967(86)90011-2

Cooper, A. A., Clifton, E. G., & Feeny, N. C. (2017). An empirical review of potential mediators and mechanisms of prolonged exposure therapy. *Clinical Psychology Review*, *56*, 106–121. http://dx.doi.org/10.1016/j.cpr.2017.07.003

Craske, M. G., Antony, M. M., & Barlow, D. H. (1997). *Mastery of your specific phobia, therapist guide*. San Antonio, TX: The Psychological Corporation.

Craske, M. G., Kircanski, K., Zelikowsky, M., Mystkowski, J., Chowdhury, N., & Baker, A. (2008). Optimizing inhibitory learning during exposure therapy. *Behaviour Research and Therapy*, *46*, 5–27. http://dx.doi.org/10.1016/j.brat.2007.10.003

Craske, M. G., & Mystkowski, J. L. (2006). Exposure therapy and extinction: Clinical studies. In M. Craske & D. Hermans (Eds.), *Fear and learning: From basic processes to clinical implications* (pp. 217–233). Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/11474-011

Deacon, B. J., & Abramowitz, J. S. (2004). Cognitive and behavioral treatments for anxiety disorders: A review of meta-analytic findings. *Journal of Clinical Psychology*, *60*, 429–441. http://dx.doi.org/10.1002/jclp.10255

de Bont, P. A., van Minnen, A., & de Jongh, A. (2013). Treating PTSD in patients with psychosis: A within-group controlled feasibility study examining the efficacy and safety of evidence-based PE and EMDR protocols. *Behavior Therapy*, *44*, 717–730. http://dx.doi.org/10.1016/j.beth.2013.07.002

Foa, E. B., Hembree, E. A., & Rothbaum, B. O. (2007). *Prolonged exposure therapy for PTSD: Emotional processing of traumatic experiences, therapist guide*. New York, NY: Oxford University Press. http://dx.doi.org/10.1093/med:psych/9780195308501.001.0001

Foa, E. B., Huppert, J. D., & Cahill, S. P. (2006). Emotional processing theory: An update. In B. O. Rothbaum (Ed.), *Pathological anxiety: Emotional processing in etiology and treatment* (pp. 3–24). New York, NY: Guilford Press.

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin*, *99*, 20–35. http://dx.doi.org/10.1037/0033-2909.99.1.20

Foa, E. B., & Rothbaum, B. O. (1998). *Treating the trauma of rape*. New York, NY: Guilford Press.

Foa, E. B., Steketee, G., Grayson, J. B., Turner, R. M., & Latimer, P. R. (1984). Deliberate exposure and blocking of obsessive-compulsive rituals: Immediate and long-term effects. *Behavior Therapy*, *15*, 450–472. http://dx.doi.org/10.1016/S0005-7894(84)80049-0

Frueh, B. C., Grubaugh, A. L., Cusack, K. J., Kimble, M. O., Elhai, J. D., & Knapp, R. G. (2009). Exposure-based cognitive-behavioral treatment of PTSD in adults with schizophrenia or schizoaffective disorder: A pilot study. *Journal of Anxiety Disorders*, *23*, 665–675. http://dx.doi.org/10.1016/j.janxdis.2009.02.005

Gallagher, M. W., & Resick, P. A. (2012). Mechanisms of change in cognitive processing therapy and prolonged exposure therapy for PTSD: Preliminary evidence for the

differential effects of hopelessness and habituation. *Cognitive Therapy and Research*, *36*, 750–755. http://dx.doi.org/10.1007/s10608-011-9423-6

Hembree, E. A., Rauch, S. A., & Foa, E. B. (2003). Beyond the manual: The insider's guide to prolonged exposure therapy for PTSD. *Cognitive and Behavioral Practice*, *10*, 22–30. http://dx.doi.org/10.1016/S1077-7229(03)80005-6

Hofmann, S. G., & Smits, J. A. (2008). Cognitive-behavioral therapy for adult anxiety disorders: A meta-analysis of randomized placebo-controlled trials. *The Journal of Clinical Psychiatry*, *69*, 621–632. http://dx.doi.org/10.4088/JCP.v69n0415

Jacoby, R. J., & Abramowitz, J. S. (2016). Inhibitory learning approaches to exposure therapy: A critical review and translation to obsessive-compulsive disorder. *Clinical Psychology Review*, *49*, 28–40. http://dx.doi.org/10.1016/j.cpr.2016.07.001

Jaycox, L. H., Foa, E. B., & Morral, A. R. (1998). Influence of emotional engagement and habituation on exposure therapy for PTSD. *Journal of Consulting and Clinical Psychology*, *66*, 185–192. http://dx.doi.org/10.1037/0022-006X.66.1.185

Jonas, D. E., Cusack, K., Forneris, C. A., Wilkins, T. M., Sonis, J., Middleton, J. C., . . . Olmsted, K. R. (2013). *Psychological and pharmacological treatments for adults with posttraumatic stress disorder (PTSD)*. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK137702/

Kaczkurkin, A. N., & Foa, E. B. (2015). Cognitive-behavioral therapy for anxiety disorders: An update on the empirical evidence. *Dialogues in Clinical Neuroscience*, *17*, 337–346.

Kozak, M. J., Foa, E. B., & Steketee, G. (1988). Process and outcome of exposure treatment with obsessive-compulsives: Psychophysiological indicators of emotional processing. *Behavior Therapy*, *19*, 157–169. http://dx.doi.org/10.1016/S0005-7894(88)80039-X

Lang, A. J., & Craske, M. G. (2000). Manipulations of exposure-based therapy to reduce return of fear: A replication. *Behaviour Research and Therapy*, *38*, 1–12. http://dx.doi.org/10.1016/S0005-7967(99)00031-5

Ledley, D. R., Foa, E. B., & Huppert, J. D. (2005). *Comprehensive cognitive behavior therapy for social phobia: A treatment manual*. Retrieved from https://www.div12.org/wp-content/uploads/2014/09/Comprehensive-CBT-for-Social-Phobia-manual.pdf

McSweeney, F. K., & Swindell, S. (2002). Common processes may contribute to extinction and habituation. *Journal of General Psychology*, *129*, 364–400. http://dx.doi.org/10.1080/00221300209602103

Meyer, J. M., Farrell, N. R., Kemp, J. J., Blakey, S. M., & Deacon, B. J. (2014). Why do clinicians exclude anxious clients from exposure therapy? *Behaviour Research and Therapy*, *54*, 49–53. http://dx.doi.org/10.1016/j.brat.2014.01.004

Mills, K. L., Teesson, M., Back, S. E., Brady, K. T., Baker, A. L., Hopwood, S., . . . Ewer, P. L. (2012). Integrated exposure-based therapy for co-occurring posttraumatic stress disorder and substance dependence: A randomized controlled trial. *JAMA*, *308*, 690–699. http://dx.doi.org/10.1001/jama.2012.9071

Myers, K. M., & Davis, M. (2007). Mechanisms of fear extinction. *Molecular Psychiatry*, *12*, 120–150. http://dx.doi.org/10.1038/sj.mp.4001939

Olatunji, B. O., Davis, M. L., Powers, M. B., & Smits, J. A. J. (2013). Cognitive-behavioral therapy for obsessive-compulsive disorder: A meta-analysis of treatment outcome and moderators. *Journal of Psychiatric Research*, *47*, 33–41. http://dx.doi.org/10.1016/j.jpsychires.2012.08.020

Pavlov, I. P. (1927). *Conditioned re?exes. An investigation of the physiological activity of the cerebral cortex*. London, England: Oxford University Press.

Pitman, R. K., Orr, S. P., Altman, B., Longpre, R. E., Poiré, R. E., Macklin, M. L., . . . Steketee, G. S. (1996). Emotional processing and outcome of imaginal flooding therapy in Vietnam veterans with chronic posttraumatic stress disorder. *Comprehensive Psychiatry*, *37*, 409–418. http://dx.doi.org/10.1016/S0010-440X(96)90024-3

Rauch, S. A., Foa, E. B., Furr, J. M., & Filip, J. C. (2004). Imagery vividness and perceived anxious arousal in prolonged exposure treatment for PTSD. *Journal of Traumatic Stress*, *17*, 461–465. http://dx.doi.org/10.1007/s10960-004-5794-8

Rothbaum, B. O., Price, M., Jovanovic, T., Norrholm, S. D., Gerardi, M., Dunlop, B., . . . Ressler, K. J. (2014). A randomized, double-blind evaluation of D-cycloserine or alprazolam combined with virtual reality exposure therapy for posttraumatic stress disorder in Iraq and Afghanistan War veterans. *The American Journal of Psychiatry*, *171*, 640–648. http://dx.doi.org/10.1176/appi.ajp.2014.13121625

Rowe, M. K., & Craske, M. G. (1998). Effects of varied-stimulus exposure training on fear reduction and return of fear. *Behaviour Research and Therapy*, *36*, 719–734. http://dx.doi.org/10.1016/S0005-7967(97)10017-1

Sloan, T., & Telch, M. J. (2002). The effects of safety-seeking behavior and guided threat reappraisal on fear reduction during exposure: An experimental investigation. *Behaviour Research and Therapy*, *40*, 235–251. http://dx.doi.org/10.1016/S0005-7967(01)00007-9

Sripada, R. K., & Rauch, S. A. (2015). Between-session and within-session habituation in prolonged exposure therapy for posttraumatic stress disorder: A hierarchical linear modeling approach. *Journal of Anxiety Disorders*, *30*, 81–87. http://dx.doi.org/10.1016/j.janxdis.2015.01.002

Telch, M. J., Valentiner, D. P., Ilai, D., Young, P. R., Powers, M. B., & Smits, J. A. (2004). Fear activation and distraction during the emotional processing of claustrophobic fear. *Journal of Behavior Therapy and Experimental Psychiatry*, *35*, 219–232. http://dx.doi.org/10.1016/j.jbtep.2004.03.004

van den Hout, M. A., van der Molen, G. M., Griez, E., Lousberg, H., & Nansen, A. (1987). Reduction of CO_2-induced anxiety in patients with panic attacks after repeated CO_2 exposure. *The American Journal of Psychiatry*, *144*, 788–791. http://dx.doi.org/10.1176/ajp.144.6.788

van Minnen, A., & Foa, E. B. (2006). The effect of imaginal exposure length on outcome of treatment for PTSD. *Journal of Traumatic Stress*, *19*, 427–438. http://dx.doi.org/10.1002/jts.20146

van Minnen, A., & Hagenaars, M. (2002). Fear activation and habituation patterns as early process predictors of response to prolonged exposure treatment in PTSD. *Journal of Traumatic Stress*, *15*, 359–367. http://dx.doi.org/10.1023/A:1020177023209

van Minnen, A., Harned, M. S., Zoellner, L., & Mills, K. (2012). Examining potential contraindications for prolonged exposure therapy for PTSD. *European Journal of Psychotraumatology*, *3*, 18805. http://dx.doi.org/10.3402/ejpt.v3i0.18805

Watson, J. P., Gaind, R., & Marks, I. M. (1972). Physiological habituation to continuous phobic stimulation. *Behaviour Research and Therapy*, *10*, 269–278. http://dx.doi.org/10.1016/0005-7967(72)90043-5

15

Inhibitory Learning

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Exposure, the repeated and systematic confrontation with feared stimuli, is a central component of cognitive behavior therapy (CBT) for anxiety and threat-related disorders. Meta-analyses of randomized controlled trials over the past several decades have demonstrated very large effect sizes for exposure therapy for anxiety disorders, whether alone or combined with coping strategies such as cognitive reappraisal or breathing/relaxation training (Cuijpers, Cristea, Karyotaki, Reijnders, & Huibers, 2016). However, although the majority of individuals improve within 10 to 20 weekly sessions of typical treatment trials, only approximately 55% achieve normative functioning (Loerinc et al., 2015), and a number experience a *return of fear*, defined as resurgence of fear from the end of exposure therapy to follow-up testing with the same object that was targeted during exposure therapy.

Over recent decades, our fundamental knowledge of basic fear learning processes has significantly evolved and has offered an explanation for return of fear and its malignant nature. These advancements offer important treatment implications and call for clinicians and researchers to adopt an advanced theoretical understanding of the mechanisms underlying exposure-based treatments based in modern associative fear learning. Within the updated inhibitory learning model of exposure, *extinction* is posited to be the critical process that results in long-term reductions of fear (Craske et al., 2008; Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014). Understanding the basic role of fear

extinction in exposure therapy requires a general grasp of fear conditioning phenomena.

In Pavlovian fear conditioning, a neutral stimulus (conditional stimulus [CS], e.g., a shape) is coupled with an aversive unconditional stimulus (US, such as a shock or loud noise). Following a number of CS–US pairing trials (shape → shock/noise), the presentation of the CS develops into a reliable predictor of the US. As a result, when the CS is presented, it generates anticipatory fear, or a conditional response (CR, such as eyeblink) that resembles the unconditional threat response (UR) to the related US. These phenomena can be translated to the real world, wherein clinically elevated anxiety can become associated with fear-relevant situations and stimuli. As an example, a young woman by the name of Taylor is taking a walk around her neighborhood when—out of nowhere—she is attacked and bitten by a German Shepherd. Taylor was previously unafraid of dogs, but after being bitten (US, dog bite) Taylor begins to fear (CR) all dogs (CS) and to avoid public spaces in which she may encounter them. This fear of dogs and its related avoidance has caused Taylor clinically significant distress and impairment.

To reduce or eliminate the CR, the CS must now lessen its status as a predictor of the US. This is achieved by *fear extinction*, which involves repeatedly presenting the CS without the US (CS–noUS, shape ↛ shock/noise). Importantly, the original CS–US relationship is not erased during extinction, but rather, a secondary relationship wherein the CS no longer predicts the US develops as a result of extinction. Under certain conditions, this CS–noUS relationship can inhibit the original, excitatory nature of the CS–US relationship (Bouton, 1993). In the previous dog bite example, Taylor's fear of dogs is extinguished by exposing her to dogs in the absence of being bitten (CS–noUS). After systematically exposing Taylor to dogs, the notion of dogs being predictive of dog bite is dampened by new, inhibitory learning that dogs are not predictive of dog bite. This new, inhibitory learning has extinguished Taylor's fear of dogs.

The original excitatory CS–US association, however, can be uncovered in several ways, including *spontaneous recovery* (Quirk, 2002)—the reemergence of a previously extinguished conditioned response after a delay. For example, after completion of exposure therapy, Taylor's fear of dogs may return in a seemingly inexplicable manner. Furthermore, because extinction learning is limited by context, renewal of conditional fear may occur if the surrounding context is changed between extinction and retest (i.e., *context renewal*; Bouton, 2002). This highlights the importance of context variability in exposure therapy, discussed in further detail later in the chapter. Finally, *reinstatement* of conditional fear occurs if unsignaled US presentations occur between extinction and retest (Haaker, Golkar, Hermans, & Lonsdorf, 2014). Clinically translated, adverse events following exposure therapy may lead to a return of fear of the previously feared stimulus. Fourth, *rapid reacquisition* of the CR is seen if the CS–US pairings are repeated following extinction (Ricker & Bouton, 1996), as may occur in dangerous environments. In addition to offering an explanation

for return of fear following exposure therapy, these processes suggest possible pathways through which exposure therapy can be optimized to reduce the return of fear (Craske et al., 2014).

Traditional, habituation-based models of exposure therapy (see Chapter 14) posit that fear reduction during and between exposure trials is required for lasting changes in the perceived harm associated with a given phobic stimulus. Thus, habituation-based exposure approaches have focused on fear reduction within and between sessions as an index of treatment response and success (e.g., Foa, Huppert, & Cahill, 2006; Foa & Kozak, 1986). However, our understanding of the role of fear reduction—or *habituation*—in exposure has also evolved with advances in associative learning theory. The amount that fear has been reduced by the end of an exposure trial or series of exposure trials is not a reliable predictor of the fear level expressed at follow-up assessment (Baker et al., 2010; Culver, Stoyanova, & Craske, 2012; Kircanski et al., 2012; Meuret, Seidel, Rosenfield, Hofmann, & Rosenfield, 2012). Similar results have been found in laboratory paradigms with animals and human samples (Plendl & Wotjak, 2010; Prenoveau, Craske, Liao, & Ornitz, 2013; Rescorla, 2006). To combat return of fear, inhibitory learning models of exposure do not emphasize fear reduction during exposure trials and instead focus on optimizing the strength and durability of the CS–noUS relationship that occurs during extinction learning.

Numerous strategies translated from basic fear learning research can be implemented during exposure to enhance inhibitory learning. These methods include enhancing inhibitory learning through (a) expectancy violation, (b) removal of safety signals, (c) attentional focus, (d) deepened extinction, (e) stimulus variability, (f) occasional reinforced extinction, and enhancing retrieval of inhibitory learning via (g) multiple contexts and (h) retrieval cues. This chapter focuses on ways to implement and capitalize on these strategies within treatment to achieve superior extinction learning.

IMPLEMENTATION

Expectancy Violation

As defined in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013), anxiety disorders are associated with the overprediction of aversive, negative outcomes. For example, an individual with social anxiety may expect with absolute certainty that if they were to attend a social gathering they would be rejected by peers. Similarly, someone with panic attacks may expect with high confidence that experiencing a rapid heart rate will result in a heart attack. Enhancing extinction learning during exposure requires that exposure exercises be designed to maximally violate an individual's elevated expectancies regarding the frequency or intensity of predicted, aversive outcomes (Davey, 1992; Rescorla & Wagner, 1972). Based in learning theory, *expectancy violation* posits that the

mismatch between expectation and outcome for a given situation is critical for new learning (Rescorla & Wagner, 1972). Specifically, expectancy violation leads to the development of alternative inhibitory expectancies that will compete with current excitatory expectancies. In other words, the more the expectancy can be violated in a given exposure, the stronger the inhibitory expectancies that compete with excitatory expectancies will be.

Exposure therapy based in inhibitory learning principles requires that exposures be designed to accommodate what the patient "needs to learn" regarding feared outcomes (Craske et al., 2008, 2014). This is in contrast to traditional habituation-based exposures that focus on fear reduction within or between exposure exercises or "staying in the situation until fear declines." Expectancy violation ties exposure parameters directly to consciously stated expectancies for aversive events. Within this approach to exposure, CSs are defined as physical sensations, situations and settings, objects, or thoughts and images predictive of a defined feared outcome or US. For example, a patient with panic attacks may predict that an elevated heart rate over 120 BPM during a panic attack will cause them to faint and injure themselves. Here, the patient has identified a panic-relevant CS—conditional stimulus—as having an elevated heart rate and the US—unconditional stimulus—as injury from fainting. Thus, an exposure exercise for this patient should be designed to directly violate the patient's expectancy of fainting and becoming injured during a panic attack when their heart rate is elevated above 120 BPM. Clinicians can use the questions outlined in Table 15.1 to assess fear-relevant CSs.

TABLE 15.1. Questions for Assessing Expectancies of Conditional Stimuli for Exposure Practices

Excitatory conditional stimuli	Assessment question
Physical sensations	What physical sensations make you think you are more likely to experience [*defined feared outcome*]?
Situations and settings	What situations or settings make you think you are more likely to experience [*defined feared outcome*]?
Feared objects	What objects make you think you are more likely to experience [*defined feared outcome*]?
Feared thoughts/images	What thoughts or images make you think you are more likely to experience [*defined feared outcome*]?
Duration	How long do you need to experience the feared physical sensation, situation, object, or thought until you are convinced [*defined feared outcome*] will occur?

Inhibitory conditional stimuli	Assessment question
Safety thoughts or behaviors	What are some behaviors you engage in to avoid [*defined feared outcome*] or that make you think [*defined feared outcome*] is less likely to occur?
Safety objects	What are some objects that make you think [*defined feared outcome*] is less likely to occur (e.g., cell phone, anxiety pills)?
Safe places	What are some places that make you think [*defined feared outcome*] is less likely to occur?

Note. From the UCLA Anxiety and Depression Research Center. Reprinted with permission of Jonathan S. Abramowitz and Shannon M. Blakey.

Identified CSs should be confronted over the course of exposure therapy. Table 15.2 provides an overview of the various methods to enhance inhibitory learning that we discuss in this section.

To facilitate extinction learning, each exposure trial is focused on determining whether the expected negative outcome occurred or not, or was as "bad" as expected (i.e., was manageable or not). Following each exposure, learning is consolidated by asking participants to judge what they learned regarding the nonoccurrence of the feared event, discrepancies between what was predicted and what occurred, and the degree of surprise from the exposure practice (Craske et al., 2014). The phrase "test it out" is helpful to introduce to patients when providing rationale for expectancy violation.

The end of an exposure trial is determined by conditions that violate expectancies. Furthermore, exposures are continued for the duration determined to violate expectancies most effectively. An individual with social anxiety may avoid one-on-one conversations for fear of rejection. To determine the duration of a related exposure exercise, the therapist should assess with the patient how long the patient needs to participate in a one-on-one conversation until they are convinced that rejection will occur. If the patient states with certainty that rejection will occur after only 5 minutes of conversation, the duration of the exposure practice should be constructed to last for more than 5 minutes to maximally violate this excitatory expectancy. Using an inhibitory learning approach, graduated exposure may be used by clinicians to progressively modulate conditions in which the feared outcome is judged most likely to occur. For example, one-on-one conversation exposure exercises for social anxiety may be conducted at increasingly longer trials (e.g., 5 minutes, 10 minutes), regardless of the observed fear reduction, in an effort to further violate expectancies and extinguish related fear. In several studies, failure to

TABLE 15.2. Strategies for Enhancing Inhibitory Learning

Strategy	Description	Catchphrase
Expectancy violation	Design exposures to violate specific expectations	*Test it out*
Remove safety behaviors	Decrease the use of safety signals and behaviors	*Throw it out*
Variability	Vary stimuli and contexts	*Vary it up*
Deepened extinction	Present two cues during the same exposure after conducting initial extinction with at least one of them	*Combine it*
Reinforced extinction	Occasionally present the US during exposures	*Face your fear*
Variability	Vary stimuli and contexts	*Vary it up*
Attentional focus	Maintain attention on the target CS during exposure	*Stay with it*
Mental reinstatement/ retrieval cues	Use a cue present during extinction or imaginally reinstate previous successful exposures	*Bring it back*

Note. US = unconditional stimulus; CS = conditional stimulus. From the UCLA Anxiety and Depression Research Center. Reprinted with permission of Jonathan S. Abramowitz and Shannon M. Blakey.

habituate throughout exposure therapy was not associated with poorer outcomes (e.g., Culver et al., 2012; Kircanski et al., 2012; Lang & Craske, 2000).

For most anxiety-related disorders, it is indisputable that the defined negative outcome has not occurred during a given exposure exercise. For example, an individual predicts that experiencing panic-related symptoms (e.g., rapid heartbeat) will result in a heart attack. Testing out whether or not a heart attack will occur during an interoceptive exposure practice is straightforward. Similarly, determining whether or not a dog-phobic individual is actually bitten in the presence of a dog during an exposure exercise is a clear-cut experimental test. However, certain feared outcomes may be loosely defined by anxious patients. For example, socially anxious individuals fear being rejected in social situations. Determining whether social rejection has occurred is more ambiguous than assessing for other feared outcomes, so it is integral that the therapist and patient together define the behavioral indicators that represent social rejection. Rejection indicators to look for in in vivo exposures for feared social encounters may include a furrowed brow, squinted eyes, eye rolling, denying a request, and walking away from the patient. After operationalizing social rejection, an individual with social anxiety is instructed by the therapist to gather evidence for the presence of rejection by looking for these predefined indicators of rejection during interpersonal exposure practices.

Another common loosely defined outcome for individuals is that they will be unable to tolerate the distress (e.g., uncertainty, disgust, stress) associated with an anxiety-provoking event. This feared outcome is common for individuals suffering from panic disorder, posttraumatic stress disorder, and obsessive-compulsive disorder. Therefore, it is important that the expectations surrounding inability to tolerate distress be clearly defined. For example, an individual completing imaginal exposure for trauma may expect that stress from recounting a trauma may cause them to be unable to function for the rest of the day or lose control. To test out this feared outcome, a therapist should have a patient complete minor tasks immediately following a given exposure to demonstrate that the patient is able to function in the face of distress. Exhibit 15.1 is a worksheet that can be used when designing and completing exposure practices as we describe in this section.

Given that extinction learning is enhanced by the mismatch between expectancy and actual outcome, reducing expectancy prior to a given exposure trial can have a negative impact on extinction learning. Common cognitive restructuring practices designed to lessen probability overestimation (e.g., "I am unlikely to be bitten by the dog") and perceived negative valence (e.g., "It is not so bad to be rejected") may be deleterious to inhibitory learning when employed prior to or during exposures (Craske et al., 2014). As a result, cognitive restructuring conducted prior to or during exposure may negatively impact exposure effectiveness. Therefore, clinicians practicing exposure from an inhibitory approach should limit cognitive restructuring to the consolidation phase following exposure therapy. However, it should be noted that exposure in and of itself provides experiences that lead to less negative expectancies

EXHIBIT 15.1

Inhibitory Learning Exposure Worksheet

What feared outcome am I most worried about? <u>or</u> What am I worried I will not be able to tolerate?

_____

How am I testing it out (Situations, Settings)?

_____

_____

Strategies for this Session (Check All That Apply):

☐   What am I *throwing out*? _____

☐   How will I *stay with it*? _____

☐   How will I *combine it*? _____

☐   How will I *face it*? _____

Put it all together: *What is my "exposure"?*

_____

_____

Prior to   How likely is it that what I am most worried about will occur
Exposure: (0 = *Not at All*, 100 = *Certain*)? _____

Now Complete Exposure Practice

After   Did what I was most worried about occur?   Yes _____   No _____
Exposure:
            _____

            _____

            How do I know? _____

            What did I expect to happen as a result of doing the exposure? What
            happened? Did that surprise me?

            What did I learn? _____

            Imagine I repeated the same exposure practice. How likely is it that what I was
            most worried about before will occur this time (0 = *Not at All*, 100 = *Certain*)?
            _____

Note. From the UCLA Anxiety and Depression Research Center. Reprinted with permission of Jonathan S. Abramowitz and Shannon M. Blakey.

or appraisals. Although not directly addressed during exposure trials, maladaptive cognitions regarding the probability and perceived negative valence of anxiety-provoking events are modified through inhibitory learning resulting from direct exposure to the events themselves.

Removal of Safety Signals and Behaviors

To maximally violate feared outcome expectancies, safety signals and/or behaviors must be removed during exposure practices. Indicators of safety include cell phones, another person, and anxiolytic medications, for example. Safety signals predict the absence of the feared outcome, or US, making safety signals conditional stimuli of negative predictive value, or *conditional inhibitors* (CS−). Thus, when a safety signal (CS−) is presented in concert with a feared conditional stimulus (CS+), the safety signal (CS−) is posited to reduce expectation of the feared outcome (US; McConnell & Miller, 2010). Therefore, safety signals are posited to interfere with extinction learning and the development of secondary inhibitory associations with the presented CS+. This protection-from-extinction phenomenon in the presence of conditional inhibitors has been reliably observed in animal studies (e.g., Rescorla, 2003). Similar to safety signals, safety behaviors are deployed by individuals to avoid excitatory CSs that are predictive of a feared outcome. As a result, safety behaviors, such as diverting attention, reduce the salience of excitatory stimuli and interfere with extinction learning (see Troubleshooting for further information). Safety signals and behaviors should be discontinued as soon as possible given that their immediate removal will expedite the formation of inhibitory associations for excitatory stimuli. However, if a patient is unwilling to discontinue use of safety signals and behaviors at the beginning of exposure therapy, these can be gradually phased out over the course of treatment (Hermans, Craske, Mineka, & Lovibond, 2006).

To assess for safety behaviors and signals, the therapist can query the patient, "What are some behaviors you engage in to avoid [defined feared outcome] or that make you think [defined feared outcome] is less likely to occur?" When explaining the rationale for safety signal and behavior removal during exposure, clinicians can use the phrase "throw it out." For example, consider the following case example and its removal of safety signals and behaviors.

> Cameron has been diagnosed with social anxiety disorder.[1] Currently, Cameron only feels comfortable being in group settings with his partner. He feels that being with his partner in a group reduces the likelihood of being evaluated negatively by others. To increase expectancy of rejection, Cameron and his therapist have agreed to Cameron's attending a friend's party without the partner present. Cameron will look for behavioral indicators of rejection while engaging in group conversation at the party. Cameron will also refrain from using his cell phone during the practice, another safety behavior. Here, Cameron is "throwing out" safety signals of his partner and cellphone.

---

[1]All clinical case material has been altered to protect patient confidentiality.

Attentional Focus

One of the critical variables in modern associative learning models is the attentional salience of presented CSs (Rescorla & Wagner, 1972). Thus, within an inhibitory learning approach to exposure, increased salience of the CS (e.g., conspicuous, attention-grabbing; Pearce & Hall, 1980) enhances extinction learning. To optimize salience and subsequent extinction, directing a patient's attention to excitatory CSs during all exposures trials is critical. Given that distraction is a common avoidant safety behavior, clinicians should encourage patients to "throw out" any methods they commonly use to divert attention away from elements of the exposure stimulus in an effort to reduce anxiety (see Troubleshooting). For example, as a safety behavior, an individual with social anxiety may avoid making eye contact during social interactions, which results in reduced attentional salience of the nonoccurrence of behaviors that violate his feared outcome prediction (e.g., eye rolling). Furthermore, inhibitory stimuli, specifically safety objects, may compete for attention from the patient, thereby reducing sustained attention directed toward excitatory stimuli present in a given exposure trial and interfering with extinction learning. Similar effects are observed when two highly salient excitatory stimuli are presented at the same time during a given trial (i.e., overshadowing; cf. Cook & Mineka, 1987). Considerations for presenting multiple stimuli at the same time in an exposure trial are outlined in the Deepened Extinction section. The phrase "stay with it" may be used to convey the rationale behind attentional salience.

Deepened Extinction

Extinction learning may also be enhanced through the simultaneous presentation of multiple feared stimuli during exposure therapy, resulting in a *deepened extinction* of conditioned fear. This strategy is achieved by (a) extinguishing the conditional fear response for each feared stimulus in isolation, followed by (b) simultaneous presentation of the stimuli during subsequent exposures. Deepened extinction may also occur by pairing an extinguished fear cue with a feared stimulus that has not been previously presented. When two feared stimuli are eventually presented together, expectation that the feared outcome will occur is intensified. With expectancy elevated, there is a greater mismatch between predicted and actual outcome and further extinction learning. Wherever possible, clinicians should combine multiple feared stimuli during exposure after conducting some exposure to each cue, or one cue, in isolation. To deepen extinction learning, it is integral that the chosen feared stimuli predict the same feared outcome or unconditional stimulus—US. Clinicians should draw attention to the increase in expectancy when presenting concurrent excitatory stimuli and its subsequent violation. The phrase "combine it" may be used by clinicians to describe the principle of deepened extinction to patients. Consider the following case example and its implementation of the deepened extinction strategy.

> *Joel has been diagnosed with panic disorder. He is fearful that experiencing panic-related sensations, specifically lightheadedness and hyperventilation, will result in experiencing a*

stroke. Joel has completed exposures for fear of light-headedness with chair spinning exercises and confronted the fear of shortness of breath through straw breathing exercises. Joel's therapist may choose to deepen extinction learning by having Joel complete straw breathing exercises while spinning in a chair.

Stimulus Variability

Research indicates that variable practice enhances the capacity for new learning (Bjork & Bjork, 1992, 2006). Variation results in effortful encoding of learning resulting from exposure trials and gives rise to a schema that may be applied across a range of fear-provoking situations (Bjork & Bjork, 1992). Importantly, varied practice has been shown to increase the array of associated cues that may be present during retrieval (Estes, 1955), making inhibitory associations of CSs more accessible at a later time. The following example highlights the importance of stimulus variability during exposure.

Logan presents for treatment of his fear of spiders. To extinguish his fear, Logan's therapist conducts multiple exposure trials with the same large tarantula. Logan now reports that his fear of spiders and avoidance of places where he may encounter a spider has disappeared. He and his therapist then terminate treatment. Months later, while hiking, Logan walks into a golden banana spider's web. Logan's fear and avoidance of spiders return.

In this example, when hiking, Logan was unable to access the inhibitory associations he had developed with his therapist months earlier. This return of fear is likely due to the fact that inhibitory learning was confined to a specific type of spider, rather than extended to a general schema of spiders. Developing multiple retrieval cues and a general inhibitory rule relating to spiders requires that Logan be exposed to multiple spider types with varying features.

Variability in exposures can also be applied to exposure duration, timing of exposures, levels of emotional intensity, and expectancy levels. This approach is in contrast to moving through exposures in a stepped, hierarchical fashion. Emphasizing variability has been shown to attenuate fear renewal and result in superior outcomes at follow-up (e.g., Kircanski et al., 2012; Rowe & Craske, 1998; Tsao & Craske, 2000). "Change it up" is a helpful phrase for presenting the rationale behind stimulus variability.

Multiple Contexts

Fear may also return when a phobic stimulus is encountered in an environment that is different from the extinction or exposure context, resulting in context renewal (Mineka, Mystkowski, Hladek, & Rodriguez, 1999; Mystkowski, Craske, & Echiverri, 2002; Rodriguez et al., 2004). To buffer from context renewal and enhance retrievability of inhibitory learning, exposures should be conducted in multiple different contexts. Variation in contexts during exposure includes conducting exposure in multiple locations, at varying times of day, in unfamiliar places, and both alone and with a therapist.

Occasional Reinforced Extinction

Evidence suggests that extinction can be enhanced by occasional paired presentations (CS–US) of the unconditional stimulus (US) and conditional stimulus (CS) during extinction training (e.g., shape → noise; Bouton, Woods, & Pineño, 2004). *Occasional reinforced extinction* is thought to result in an increase in the salience of the CS or an increase in expectancy during subsequent extinction trials (see Craske et al., 2014, for more details). Regardless of the mechanism, occasional reinforced extinction results in attenuated, subsequent reacquisition of fear in animals and humans (Bouton et al., 2004; Culver, Stevens, Fanselow, & Craske, 2018).

Translated to clinical applications, extinction learning during exposure therapy may be enhanced by occasionally presenting conditional stimuli with the corresponding predicted feared outcome. For example, social anxiety exposures may include the occasional presentation of social rejection, and exposures for panic disorder may involve inducing intense physiological sensations that increase the anticipation of a panic attack. Rapid reacquisition of fear is most probable for presentations of anxiety in which the individual might experience repeated aversive outcomes after treatment, such as social rejection or panic. As a result, planning for occasional reinforced exposure practices may be most beneficial in the treatment of social anxiety and panic attacks. Occasional reinforcement may not always be appropriate, and certainly not when the aversive outcome may cause undue harm to an individual. As examples, it would clearly not be ethical to reexpose an individual with posttraumatic stress symptoms to a traumatic experience or to expose someone with a fear of snakes to an actual snake bite. Furthermore, occasional reinforced extinction should be employed during the later phase of treatment. When explaining the rationale to patients, we find the phrase "face your fear" helpful for occasional reinforced extinction.

Retrieval Cues

Given that extinction learning is highly context dependent, the addition of *retrieval cues* may also assist with accessing extinction learning after exposure in completed. Posited to buffer individuals from deleterious context renewal, a retrieval cue, such as a wristband or mental reinstatement (i.e., cognitive exercises that retrieve the memory of previous extinction learning; see Mystkowski, Craske, Echiverri, & Labus, 2006, for details), can be used in different, unfamiliar contexts once therapy is completed (Brooks & Bouton, 1994; Dibbets & Maes, 2011; Vansteenwegen et al., 2006). Given that retrieval cues may reduce expectancy during an exposure trial in a new context, they should be used as a relapse prevention strategy prior to termination of therapy. Of note, retrieval cues may acquire an inhibitory value and, as a result, become safety signals (Dibbets, Havermans, & Arntz, 2008). The distinct difference between retrieval cues and safety signals, however, is that retrieval cues act

to retrieve inhibitory learning, whereas safety signals possess a direct associative relationship with the nonoccurrence of a given feared outcome (Craske et al., 2014). For example, a therapist's office where previous exposure sessions had taken place can act as a retrieval cue for a new exposure, whereas benzodiazepines (e.g., in the case of panic disorder) can act as a safety signal.

The process of developing retrieval cues with patients should be used sparingly to mitigate the likelihood of retrieval cues becoming safety signals. Using the phrase "bring it back" has been helpful in explaining this rationale. Retrieval cues should be introduced as a relapse prevention strategy toward the end of exposure therapy. The following is an example of how to explain the process of mental reinstatement as retrieval cue for a patient with panic disorder.

> *Although we've conducted many exposure practices over the course of treatment, we may not be able to completely and permanently overpower the original fear associations that led to your developing panic attacks. Over time, you may forget the new learning that was formed during treatment, which can put you at risk for a return of fear. However, we have a strategy that can help our brains remember our new learning and buffer us from lapsing back into fear. To help our brains remember our new learning and override our original fear associations, we can vividly recall an exposure practice that went well. Think of one of our exposure practices that went especially well. I'd like you to recall this as vividly as you can . . . the situation . . . the outcome. I'd like you to practice "bringing it back" three times over the next week prior to conducting an exposure exercise. It is important that we not rely on this as a safety behavior, though, so we don't want to do this every time we do an exposure.*

OUTCOME INDICATORS

Given that fear expression during exposure is (a) incommensurate with fear learning (see Craske et al., 2008) and (b) an unreliable predictor of treatment outcomes, fear reduction (generally measured by subjective units of distress) between and within sessions should not be used as an index of inhibitory learning. Rather, expectancy ratings and their reduction pre- to postexposure and across exposure trials with the same CSs provide a more appropriate index of the potential for expectancy violation and extinction learning. Prior to exposure, patients should give an expectancy rating for a given feared outcome on a 0-to-100-point scale, where 0 represents the belief that the feared outcome is *not at all likely to happen* and 100 is *entirely certain the feared outcome will happen*. This rating can be assessed by asking the question "How likely is it that what I am/you are most worried about will occur?" Using the same rating anchors, the postexposure expectancy level can also be assessed by asking, "Imagine you repeated the same exposure practice. How likely is it that what I was/you were most worried about before will occur this time?"

Self-reported expectancy ratings may not provide a complete representation of achieved extinction learning during exposure therapy. Additional measurement methods need to be developed and adopted for a more accurate index of inhibitory learning that will aid therapists in clinical decision making.

Personalized implicit association tests administered during treatment are a promising avenue in the of assessment of inhibitory learning (see Vasey, Harbaugh, Buffington, Jones, & Fazio, 2012). Such implicit measures may provide less biased measures of extinction learning by removing demand characteristics that exist in therapeutic settings and may influence self-reported expectancies.

EMPIRICAL SUPPORT

Emphasizing expectancy violation in exposure therapy has demonstrated similar to superior outcomes when compared with traditional habituation-based approaches. For example, exposure durations that exceeded expectancies for the timing of an aversive outcome in individuals with acrophobia (i.e., specific phobia of heights) were as effective as standard exposure therapy, even though exposure was conducted over many fewer exposure trials (i.e., repeated trials of exposure each day vs. one trial of exposure per 2 days; Baker et al., 2010). For individuals with elevated anxiety sensitivity, intensive interoceptive exposure that was continued until a patient's expectancy for a given feared outcome reached less than 5% outperformed standard interoceptive exposure on various outcome measures (Deacon et al., 2013). Of note, one significant limitation of this study was that the "intensive" group received more trials of exposure, making it unclear how total duration of exposure, rather than expectancy violation, affected outcome. Currently, the expectancy violation approach is primarily supported by a substantial body of basic experimental findings (e.g., Rescorla & Wagner, 1972; see Craske et al., 2014, for a review).

Other methods employed during exposure trials aimed at optimizing extinction learning are largely supported by experimental laboratory studies. Deepened extinction has been shown to reduce spontaneous recovery and reinstatement of fear in animals (Rescorla, 2006) and humans (Culver, Vervliet, & Craske, 2015). Similarly, occasional reinforcement during extinction was found to attenuate subsequent reacquisition of fear in both animal (Bouton et al., 2004) and human studies (Culver et al., 2018). The strategy of variability has been directly applied to exposure and examined in fearful samples with promising results. In spider-phobic individuals, variability of timing between exposure sessions and of the stimulus itself led to superior outcomes when compared with nonvariable massed exposure (Lang & Craske, 2000; Rowe & Craske, 1998; Tsao & Craske, 2000), although a study of contaminant anxiety showed results only at the trend level (Kircanski et al., 2012).

Findings regarding removal of safety behaviors and signals are less consistent than findings regarding other methods of optimizing extinction learning (for an inhibitory-learning-based review, see Blakey & Abramowitz, 2016). In clinical samples, the availability and use of safety signals and behaviors have been shown to be detrimental to exposure therapy (Sloan & Telch, 2002). Providing instructions to refrain from using safety behaviors has also been shown to improve outcomes (Salkovskis, 1991). However, recent data suggest

contradictory findings (Rachman, Shafran, Radomsky, & Zysk, 2011). Specifically, the use of hygienic wipes following exposures for individuals with contamination fears did not lead to any more spontaneous recovery of fear or disgust than exposure without hygienic wipes. Similarly, continuing to engage in safety behaviors, or having them available for use, was not observed to affect outcomes deleteriously (Deacon, Sy, Lickel, & Nelson, 2010; Sy, Dixon, Lickel, Nelson, & Deacon, 2011). Inconsistent results may be accounted for by differences in the ratio of safety signal inhibition and excitatory stimuli within exposure trials and across studies (see Craske et al., 2014, for a more detailed explanation). Although these results are currently inconsistent, the general consensus remains that safety signals and behaviors should be removed systematically over the course of exposure therapy (Hermans et al., 2006).

Strategies that increase retrievability of extinction learning possess less consistent results than strategies that enhance extinction learning. Multiple contexts have been shown to offset context renewal in human laboratory studies (e.g., Balooch & Neumann, 2011; Balooch, Neumann, & Boschen, 2012) and in a clinical analog study of exposure therapy (Vansteenwegen et al., 2007). However, one conditioning study with rodents (Bouton, García-Gutiérrez, Zilski, & Moody, 2006) and another conditioning study with humans (Neumann, Lipp, & Cory, 2007) failed to demonstrate detectable benefits of multiple contexts throughout extinction on context renewal, suggesting that the effects may be unstable. Similarly inconsistent results have been observed regarding retrieval cues. Mental reinstatement of prior extinction learning was demonstrated to limit context renewal in spider-phobic individuals (Mystkowski et al., 2006). The effects of retrieval cues, such as distinctive pen and clipboard, were found to be very weak in one study for public-speaking-phobic individuals (Culver, Stoyanova, & Craske, 2011).

In sum, findings from basic research and treatment studies largely support methods that enhance inhibitory learning (e.g., deepened extinction, occasional reinforcement). Strategies that are geared toward enhancing retrieval of extinction learning currently show inconsistent results in a limited number of studies. Overall, additional translational research in clinical samples is necessary to examine the extent to which inhibitory learning-based exposure strategies enhance treatment outcomes or outperform traditional habituation-focused exposure therapy.

TROUBLESHOOTING

Avoidance

Individuals with anxiety disorders tend to engage in excessive avoidance behavior, resulting in limited experiences with situations, stimuli, or sensations that they perceive as threatening. As a result, avoidance prevents learning that feared stimuli are actually safe (i.e., inhibitory associations, fear extinction; Craske, Hermans, & Vervliet, 2018). For these reasons, exposure

treatments are designed to help the patient approach situations that have been avoided. Patients are likely to engage in avoidance behaviors during exposure treatment, resulting in an insufficient response or nonresponse to exposure therapy.

Avoidance of feared stimuli during exposure therapy may be conspicuous and easily identified by the therapist. Most commonly, patients engaging in avoidance return to session with unfinished exposure assignments. Similarly, to reduce the likelihood of a given feared outcome, patients engaging in avoidance may only partially complete exposure assignments. For example, a patient with panic disorder may be absolutely certain that hyperventilating for 1 minute will result in a stroke. To violate this expectation, the patient's therapist assigns the patient to hyperventilate in 15-second intervals for 2 minutes as a take-home exposure assignment. The patient returns next session reporting that they completed the assignment but were able to hyperventilate for only 45 seconds. In this example, the avoidance has reduced the potency of the learning experience because the patient did not exceed the duration that was defined to result in a stroke (i.e., 1 minute). As a result, the patient's new inhibitory associations formed from the exposure were restricted and extinction learning suboptimal when compared with the initial planned exposure.

Patients may also engage in discreet avoidance or escape behaviors during a given exposure trial. These behaviors may not be as easily observed and therefore require therapists to watch attentively for their potential interference. A common inconspicuous avoidance behavior often shown by patients with anxiety disorders during an exposure is shifting attention away from feared stimuli. In the absence of engagement with a feared stimulus, an individual is likely to not notice whether or not the negative event they expected even occurred. Unquestionably, this behavior compromises the development of new inhibitory learning. Several studies in anxious adults have shown that individuals who selectively attend toward threat (e.g., Price, Mehta, Tone, & Anderson, 2011) or demonstrate greater difficulty disengaging from threatening stimuli (Barry, Sewart, Arch, & Craske, 2015) in laboratory tasks prior to CBT show greater improvement of symptoms when compared to those who show no bias or avoid threat.

For example, individuals with severe social anxiety may avoid eye contact with other individuals as a safety behavior. As aforementioned, abstaining from eye contact with others allows socially anxious persons to avoid salient behavioral indicators of rejection, such as squinted eyes or a furrowed brow, and may reduce distress associated with the event—which is likely to have an added predictive value of rejection (e.g., "If I make eye contact, I will see someone is judging me, which will make me anxious. This anxiety will lead me to blush and stutter during the conversation. If I blush and stutter, people will think I'm weird and reject me"). Thus, expectancy violation is limited during an exposure in which avoidance of eye contact is employed by a socially anxious patient. Individuals with specific phobia are likely to avoid looking directly at phobic stimuli. Similarly, persons with panic disorder may avoid internal physiological sensations related to panic by shifting their attention to other stimuli, internal or external.

If a patient does not report reductions in expectancies for feared outcomes during the course of treatment, avoidance may partially account for observed treatment stagnation. Therefore, it is essential that therapists practicing exposure from an inhibitory learning perspective provide substantial psychoeducation on the role of avoidance in anxiety disorders. Together, therapists and patients should identify pernicious avoidance behaviors at the first session and continually monitor for their occurrence over the course of treatment. Furthermore, therapists should constantly monitor for unidentified avoidance behaviors that may reduce expectancy and interfere with new learning. When new avoidance behaviors are identified, therapist and patient should discuss how to monitor, reduce, and eliminate their future occurrence.

After the conclusion of exposure therapy, the return of previously extinguished fear responses is not uncommon. However, return of fear posttreatment is problematic only when accompanied by escape or avoidance behaviors. Return of fear itself is a transient state with limited clinical implications (Craske et al., 2018). In the absence of escape or avoidance, return of fear is followed by additional experience that provides extinction learning and eventual fear reduction. Prior to the conclusion of exposure therapy, therapists should highlight the inevitability of residual anxiety and stress to patients that continued exposure practice to feared stimuli following treatment is essential in maintaining treatment gains.

Integration of Family Members

For anxious patients, family members or significant others may inadvertently reinforce avoidance behaviors and, as a result, interfere with extinction learning. Aiding in avoidance is an understandable solution that reduces significant anxiety from a family member's or significant other's perspective. Seeing an anxious loved one in distress urges individuals to engage in and reinforce behaviors that reduce the loved one's negative outcome expectancies. However, an individual facilitating reduction of expectancy may acquire an inhibitory value and develop into a safety signal. If family members and significant others are aiding in avoidance behaviors, therapists should incorporate removal of these behaviors into exposure practices. Therapists should encourage patients to discuss the rationale for safety behavior removal with loved ones. If loved ones continue to reinforce safety behaviors during treatment, it may be beneficial to request that they attend a limited number of sessions so that therapists may directly provide further treatment rationale and psychoeducation on anxiety disorders.

CONCLUSION

Advances in research on associative fear learning suggest that extinction learning, achieved through repeated presentation of a given CS without the US (i.e., CS–noUS), is likely a critical mechanism underlying exposure therapy

(Craske et al., 2008, 2014; Rescorla & Wagner, 1972). Development of CS–noUS associations must occur to inhibit—not erase—existing excitatory associations (CS–US) that are responsible for maladaptive fear responding and anxiety (CR). To maximize treatment outcomes and maintain long-term gains, this theoretical understanding of exposure therapy requires clinicians to emphasize therapeutic strategies that increase inhibitory learning. Such strategies translated from basic associative learning theory include expectancy violation, immediate removal of safety behaviors and signals, stimulus variability and multiple contexts, deepened extinction, attentional focus, occasional reinforced extinction when appropriate, and retrieval cues. Inhibitory learning-focused strategies are distinct from traditional, habituation-based exposure practices that aim to decrease fear responding (e.g., staying in a situation until fear sufficiently declines). Evidence supporting inhibitory learning-based exposure strategies is currently limited, and further research is warranted to determine the extent to which inhibitory learning-based exposure strategies enhance treatment outcomes or outperform traditional habituation-focused exposure therapy. Overall, the translation of inhibitory learning principles into exposure therapy is an exciting and critical step forward toward science-driven practice.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Baker, A., Mystkowski, J., Culver, N., Yi, R., Mortazavi, A., & Craske, M. G. (2010). Does habituation matter? Emotional processing theory and exposure therapy for acrophobia. *Behaviour Research and Therapy*, *48*, 1139–1143. http://dx.doi.org/10.1016/j.brat.2010.07.009

Balooch, S. B., & Neumann, D. L. (2011). Effects of multiple contexts and context similarity on the renewal of extinguished conditioned behaviour in an ABA design with humans. *Learning and Motivation*, *42*, 53–63. http://dx.doi.org/10.1016/j.lmot.2010.08.008

Balooch, S. B., Neumann, D. L., & Boschen, M. J. (2012). Extinction treatment in multiple contexts attenuates ABC renewal in humans. *Behaviour Research and Therapy*, *50*, 604–609. http://dx.doi.org/10.1016/j.brat.2012.06.003

Barry, T. J., Sewart, A. R., Arch, J. J., & Craske, M. G. (2015). Deficits in disengaging attention from threat predict improved response to cognitive behavioral therapy for anxiety. *Depression and Anxiety*, *32*, 892–899. http://dx.doi.org/10.1002/da.22421

Bjork, R. A., & Bjork, E. L. (1992). A new theory of disuse and an old theory of stimulus fluctuation. In A. Healy, S. Kosslyn, & R. Shiffrin (Eds.), *From learning processes to cognitive processes: Essays in honor of William K. Estes* (pp. 35–67). Hillsdale, NJ: Erlbaum.

Bjork, R. A., & Bjork, E. L. (2006). Optimizing treatment and instruction: Implications of a new theory of disuse. In L. G. Nilsson & N. Ohta (Eds.), *Memory and society: Psychological perspectives* (pp. 109–133). New York, NY: Psychology Press.

Blakey, S. M., & Abramowitz, J. S. (2016). The effects of safety behaviors during exposure therapy for anxiety: Critical analysis from an inhibitory learning perspective. *Clinical Psychology Review*, *49*, 1–15. http://dx.doi.org/10.1016/j.cpr.2016.07.002

Bouton, M. E. (1993). Context, time, and memory retrieval in the interference paradigms of Pavlovian learning. *Psychological Bulletin*, *114*(1), 80.

Bouton, M. E. (2002). Context, ambiguity, and unlearning: Sources of relapse after behavioral extinction. *Biological Psychiatry*, *52*, 976–986. http://dx.doi.org/10.1016/S0006-3223(02)01546-9

Bouton, M. E., García-Gutiérrez, A., Zilski, J., & Moody, E. W. (2006). Extinction in multiple contexts does not necessarily make extinction less vulnerable to relapse. *Behaviour Research and Therapy*, *44*, 983–994. http://dx.doi.org/10.1016/j.brat.2005.07.007

Bouton, M. E., Woods, A. M., & Pineño, O. (2004). Occasional reinforced trials during extinction can slow the rate of rapid reacquisition. *Learning and Motivation*, *35*, 371–390. http://dx.doi.org/10.1016/j.lmot.2004.05.001

Brooks, D. C., & Bouton, M. E. (1994). A retrieval cue for extinction attenuates response recovery (renewal) caused by a return to the conditioning context. *Journal of Experimental Psychology: Animal Behavior Processes*, *20*, 366–379. http://dx.doi.org/10.1037/0097-7403.20.4.366

Cook, M., & Mineka, S. (1987). Second-order conditioning and overshadowing in the observational conditioning of fear in monkeys. *Behaviour Research and Therapy*, *25*, 349–364. http://dx.doi.org/10.1016/0005-7967(87)90013-1

Craske, M. G., Hermans, D., & Vervliet, B. (2018). State-of-the-art and future directions for extinction as a translational model for fear and anxiety. *Philosophical Transactions of the Royal Society Series B. Biological Sciences*, *373*(1742), 20170025. http://dx.doi.org/10.1098/rstb.2017.0025

Craske, M. G., Kircanski, K., Zelikowsky, M., Mystkowski, J., Chowdhury, N., & Baker, A. (2008). Optimizing inhibitory learning during exposure therapy. *Behaviour Research and Therapy*, *46*, 5–27. http://dx.doi.org/10.1016/j.brat.2007.10.003

Craske, M. G., Treanor, M., Conway, C. C., Zbozinek, T., & Vervliet, B. (2014). Maximizing exposure therapy: An inhibitory learning approach. *Behaviour Research and Therapy*, *58*, 10–23. http://dx.doi.org/10.1016/j.brat.2014.04.006

Cuijpers, P., Cristea, I. A., Karyotaki, E., Reijnders, M., & Huibers, M. J. H. (2016). How effective are cognitive behavior therapies for major depression and anxiety disorders? A meta-analytic update of the evidence. *World Psychiatry*, *15*, 245–258. http://dx.doi.org/10.1002/wps.20346

Culver, N. C., Stevens, S., Fanselow, M. S., & Craske, M. G. (2018). Building physiological toughness: Some aversive events during extinction may attenuate return of fear. *Journal of Behavior Therapy and Experimental Psychiatry*, *58*, 18–28. http://dx.doi.org/10.1016/j.jbtep.2017.07.003

Culver, N. C., Stoyanova, M., & Craske, M. G. (2011). Clinical relevance of retrieval cues for attenuating context renewal of fear. *Journal of Anxiety Disorders*, *25*, 284–292. http://dx.doi.org/10.1016/j.janxdis.2010.10.002

Culver, N. C., Stoyanova, M., & Craske, M. G. (2012). Emotional variability and sustained arousal during exposure. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*, 787–793. http://dx.doi.org/10.1016/j.jbtep.2011.10.009

Culver, N. C., Vervliet, B., & Craske, M. G. (2015). Compound extinction: Using the Rescorla–Wagner model to maximize exposure therapy effects for anxiety disorders. *Clinical Psychological Science*, *3*, 335–348. http://dx.doi.org/10.1177/2167702614542103

Davey, G. C. (1992). Classical conditioning and the acquisition of human fears and phobias: A review and synthesis of the literature. *Advances in Behaviour Research and Therapy*, *14*, 29–66. http://dx.doi.org/10.1016/0146-6402(92)90010-L

Deacon, B., Kemp, J. J., Dixon, L. J., Sy, J. T., Farrell, N. R., & Zhang, A. R. (2013). Maximizing the efficacy of interoceptive exposure by optimizing inhibitory learning: A randomized controlled trial. *Behaviour Research and Therapy*, *51*, 588–596. http://dx.doi.org/10.1016/j.brat.2013.06.006

Deacon, B. J., Sy, J. T., Lickel, J. J., & Nelson, E. A. (2010). Does the judicious use of safety behaviors improve the efficacy and acceptability of exposure therapy for claustrophobic fear? *Journal of Behavior Therapy and Experimental Psychiatry*, *41*, 71–80. http://dx.doi.org/10.1016/j.jbtep.2009.10.004

Dibbets, P., Havermans, R., & Arntz, A. (2008). All we need is a cue to remember: The effect of an extinction cue on renewal. *Behaviour Research and Therapy*, *46*, 1070–1077. http://dx.doi.org/10.1016/j.brat.2008.05.007

Dibbets, P., & Maes, J. H. (2011). The effect of an extinction cue on ABA-renewal: Does valence matter? *Learning and Motivation*, *42*, 133–144. http://dx.doi.org/10.1016/j.lmot.2010.12.003

Estes, W. K. (1955). Statistical theory of distributional phenomena in learning. *Psychological Review*, *62*, 369–377. http://dx.doi.org/10.1037/h0046888

Foa, E. B., Huppert, J. D., & Cahill, S. P. (2006). Emotional processing theory: An update. In B. O. Rothbaum (Ed.), *Pathological anxiety: Emotional processing in etiology and treatment* (pp. 3–24). New York, NY: Guilford Press.

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin*, *99*, 20–35. http://dx.doi.org/10.1037/0033-2909.99.1.20

Haaker, J., Golkar, A., Hermans, D., & Lonsdorf, T. B. (2014). A review on human reinstatement studies: An overview and methodological challenges. *Learning & Memory*, *21*, 424–440. http://dx.doi.org/10.1101/lm.036053.114

Hermans, D., Craske, M. G., Mineka, S., & Lovibond, P. F. (2006). Extinction in human fear conditioning. *Biological Psychiatry*, *60*, 361–368. http://dx.doi.org/10.1016/j.biopsych.2005.10.006

Kircanski, K., Mortazavi, A., Castriotta, N., Baker, A. S., Mystkowski, J. L., Yi, R., & Craske, M. G. (2012). Challenges to the traditional exposure paradigm: Variability in exposure therapy for contamination fears. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*, 745–751. http://dx.doi.org/10.1016/j.jbtep.2011.10.010

Lang, A. J., & Craske, M. G. (2000). Manipulations of exposure-based therapy to reduce return of fear: A replication. *Behaviour Research and Therapy*, *38*, 1–12. http://dx.doi.org/10.1016/S0005-7967(99)00031-5

Loerinc, A. G., Meuret, A. E., Twohig, M. P., Rosenfield, D., Bluett, E. J., & Craske, M. G. (2015). Response rates for CBT for anxiety disorders: Need for standardized criteria. *Clinical Psychology Review*, *42*, 72–82. http://dx.doi.org/10.1016/j.cpr.2015.08.004

McConnell, B. L., & Miller, R. R. (2010). Protection from extinction provided by a conditioned inhibitor. *Learning & Behavior*, *38*, 68–79. http://dx.doi.org/10.3758/LB.38.1.68

Meuret, A. E., Seidel, A., Rosenfield, B., Hofmann, S. G., & Rosenfield, D. (2012). Does fear reactivity during exposure predict panic symptom reduction? *Journal of Consulting and Clinical Psychology*, *80*, 773–785. http://dx.doi.org/10.1037/a0028032

Mineka, S., Mystkowski, J. L., Hladek, D., & Rodriguez, B. I. (1999). The effects of changing contexts on return of fear following exposure therapy for spider fear. *Journal of Consulting and Clinical Psychology*, *67*, 599–604. http://dx.doi.org/10.1037/0022-006X.67.4.599

Mystkowski, J. L., Craske, M. G., & Echiverri, A. M. (2002). Treatment context and return of fear in spider phobia. *Behavior Therapy*, *33*, 399–416. http://dx.doi.org/10.1016/S0005-7894(02)80035-1

Mystkowski, J. L., Craske, M. G., Echiverri, A. M., & Labus, J. S. (2006). Mental reinstatement of context and return of fear in spider-fearful participants. *Behavior Therapy*, *37*, 49–60. http://dx.doi.org/10.1016/j.beth.2005.04.001

Neumann, D. L., Lipp, O. V., & Cory, S. E. (2007). Conducting extinction in multiple contexts does not necessarily attenuate the renewal of shock expectancy in a

fear-conditioning procedure with humans. *Behaviour Research and Therapy*, *45*, 385–394. http://dx.doi.org/10.1016/j.brat.2006.02.001

Pearce, J. M., & Hall, G. (1980). A model for Pavlovian learning: Variations in the effectiveness of conditioned but not of unconditioned stimuli. *Psychological Review*, *87*, 532–552. http://dx.doi.org/10.1037/0033-295X.87.6.532

Plendl, W., & Wotjak, C. T. (2010). Dissociation of within- and between-session extinction of conditioned fear. *The Journal of Neuroscience*, *30*, 4990–4998. http://dx.doi.org/10.1523/JNEUROSCI.6038-09.2010

Prenoveau, J. M., Craske, M. G., Liao, B., & Ornitz, E. M. (2013). Human fear conditioning and extinction: Timing is everything . . . or is it? *Biological Psychology*, *92*, 59–68. http://dx.doi.org/10.1016/j.biopsycho.2012.02.005

Price, M., Mehta, N., Tone, E. B., & Anderson, P. L. (2011). Does engagement with exposure yield better outcomes? Components of presence as a predictor of treatment response for virtual reality exposure therapy for social phobia. *Journal of Anxiety Disorders*, *25*, 763–770. http://dx.doi.org/10.1016/j.janxdis.2011.03.004

Quirk, G. J. (2002). Memory for extinction of conditioned fear is long-lasting and persists following spontaneous recovery. *Learning & Memory*, *9*, 402–407. http://dx.doi.org/10.1101/lm.49602

Rachman, S., Shafran, R., Radomsky, A. S., & Zysk, E. (2011). Reducing contamination by exposure plus safety behaviour. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*, 397–404. http://dx.doi.org/10.1016/j.jbtep.2011.02.010

Rescorla, R. A. (2003). Protection from extinction. *Learning & Behavior*, *31*, 124–132. http://dx.doi.org/10.3758/BF03195975

Rescorla, R. A. (2006). Deepened extinction from compound stimulus presentation. *Journal of Experimental Psychology: Animal Behavior Processes*, *32*, 135–144. http://dx.doi.org/10.1037/0097-7403.32.2.135

Rescorla, R. A., & Wagner, A. W. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In A. H. Black & W. F. Prokasy (Eds.), *Classical conditioning II: Current research and theory* (pp. 64–99). New York, NY: Appleton-Century-Crofts.

Ricker, S. T., & Bouton, M. E. (1996). Reacquisition following extinction in appetitive conditioning. *Learning & Behavior*, *24*, 423–436. http://dx.doi.org/10.3758/BF03199014

Rodriguez, B. F., Weisberg, R. B., Pagano, M. E., Machan, J. T., Culpepper, L., & Keller, M. B. (2004). Frequency and patterns of psychiatric comorbidity in a sample of primary care patients with anxiety disorders. *Comprehensive Psychiatry*, *45*, 129–137. http://dx.doi.org/10.1016/j.comppsych.2003.09.005

Rowe, M. K., & Craske, M. G. (1998). Effects of varied-stimulus exposure training on fear reduction and return of fear. *Behaviour Research and Therapy*, *36*, 719–734. http://dx.doi.org/10.1016/S0005-7967(97)10017-1

Salkovskis, P. M. (1991). The importance of behaviour in the maintenance of anxiety and panic: A cognitive account. *Behavioural Psychotherapy*, *19*, 6–19. http://dx.doi.org/10.1017/S0141347300011472

Sloan, T., & Telch, M. J. (2002). The effects of safety-seeking behavior and guided threat reappraisal on fear reduction during exposure: An experimental investigation. *Behaviour Research and Therapy*, *40*, 235–251. http://dx.doi.org/10.1016/S0005-7967(01)00007-9

Sy, J. T., Dixon, L. J., Lickel, J. J., Nelson, E. A., & Deacon, B. J. (2011). Failure to replicate the deleterious effects of safety behaviors in exposure therapy. *Behaviour Research and Therapy*, *49*, 305–314. http://dx.doi.org/10.1016/j.brat.2011.02.005

Tsao, J. C., & Craske, M. G. (2000). Timing of treatment and return of fear: Effects of massed, uniform-, and expanding-spaced exposure schedules. *Behavior Therapy*, *31*, 479–497. http://dx.doi.org/10.1016/S0005-7894(00)80026-X

Vansteenwegen, D., Vervliet, B., Hermans, D., Beckers, T., Baeyens, F., & Eelen, P. (2006). Stronger renewal in human fear conditioning when tested with an acquisition retrieval cue than with an extinction retrieval cue. *Behaviour Research and Therapy*, *44*, 1717–1725. http://dx.doi.org/10.1016/j.brat.2005.10.014

Vansteenwegen, D., Vervliet, B., Iberico, C., Baeyens, F., Van den Bergh, O., & Hermans, D. (2007). The repeated confrontation with videotapes of spiders in multiple contexts attenuates renewal of fear in spider-anxious students. *Behaviour Research and Therapy*, *45*, 1169–1179. http://dx.doi.org/10.1016/j.brat.2006.08.023

Vasey, M. W., Harbaugh, C. N., Buffington, A. G., Jones, C. R., & Fazio, R. H. (2012). Predicting return of fear following exposure therapy with an implicit measure of attitudes. *Behaviour Research and Therapy*, *50*, 767–774. http://dx.doi.org/10.1016/j.brat.2012.08.007

16

Cognitive Change via Rational Discussion

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Cognitive change via rational discussion refers to the modification of dysfunctional beliefs through the systematic, empirical, and collaborative process of identifying, evaluating, challenging, and altering maladaptive thoughts and beliefs that maintain clinical anxiety, such as those discussed in Chapter 1. As we discuss in this chapter, a number of more or less verbal strategies can be used to bring about such cognitive change. Commonly referred to as *cognitive restructuring*, this mechanism of change is a core component of cognitive behavior therapy (CBT) programs for a variety of anxiety and related disorders.

Pioneered by Ellis (1962), the basis for cognitive change via rational discussion is the assumption that human thinking and emotion are interrelated. According to Ellis's ABC model, behavioral and emotional "symptoms" are the *consequences* (C) of irrational *belief* systems (B) about particular adverse experiences, or *activating events* (A). This model assumes humans possess not only innate tendencies to think irrationally (e.g., rigidly) but also the ability to learn rational thinking through practice. Accordingly, reductions in undesirable emotions (e.g., anxiety, fear) and behaviors (e.g., avoidance) can occur as a result of verbal discussion in which rigid, unrealistic, and irrational beliefs (e.g., catastrophic thinking, low frustration tolerance) are disputed and replaced with more flexible and adaptive *rational* thinking (e.g., concern, dislike).

Similar to Ellis's (1962) model, Beck's (1987, 1996) cognitive model of emotion posits that distorted thinking and unrealistic appraisals negatively affect one's emotions and behaviors. Beck proposed that *maladaptive cognitive schemas* are inaccurate belief systems based in negative early experiences (e.g., stressful life events) that are continually reinforced by later experiences and that form clusters of biased attitudes, beliefs, and assumptions. In the context of anxiety, such biases include the tendency to exaggerate threat (see Chapter 1, this handbook), overgeneralize, personalize, view the world as uncontrollable, and view oneself as unable to cope well with adversity. Such schemas are also thought to result in biased information processing and faulty problem-solving. Accordingly, from this perspective, there are two requirements for cognitive change via rational discussion (i.e., cognitive restructuring): (a) identifying and evaluating maladaptive schemas to weaken the automaticity of unhelpful and biased beliefs, and (b) substituting objective and adaptive cognitive schemas for maladaptive schemas to foster lasting emotional and behavioral change.

Cognitive change via rational discussion to modify anxiety-related maladaptive beliefs occurs via a multistep process that involves monitoring one's own thoughts, identifying faulty or irrational cognitions, verbally or experientially challenging such cognitions, replacing them with more helpful and rational beliefs, and deepening one's conviction in one's new ways of thinking to update one's cognitive schema. To illustrate, a student with social anxiety might believe that she *couldn't stand* to be embarrassed in front of her classmates. In this instance, cognitive restructuring would be used to identify this belief as irrational (i.e., whereas embarrassment might feel *uncomfortable*, the discomfort is *temporary* and it passes with time) and then dispute it based on empirical evidence (e.g., like most people, she has felt embarrassed before, but managed to get through the situation—that is, she withstood it). Next, the student would be helped to generate a more flexible and rational way of thinking about the situation (e.g., "I wouldn't *like* to be embarrassed in front of my classmates, but if this did happen, the unpleasant feelings would be temporary and I would get through it just as I have in the past") that would help her feel less anxious about the possibility of embarrassment. The therapist would also help this individual identify, challenge, and modify related sets of core dysfunctional beliefs (i.e., schemas) that foster situation-specific assumptions about being embarrassed (e.g., beliefs that people are generally highly judgmental and that one *must always* appear competent and confident in front of others). Experiments to test the illogic of irrational beliefs and soften the individual's conviction, such as doing something to purposely embarrass herself (e.g., asking a "stupid" question in class) to see that she *can stand* the consequences, would also be used to consolidate changes in beliefs.

Teasdale and Barnard (1993) proposed two mechanisms by which changes in beliefs occur via rational discussion. First, change occurs via the creation of alternative schematic models that do not produce dysfunctional emotional reactions. Second, certain strategies (e.g., thought records) can create change

via shifts at a specific level of meaning that leads to either the creation of new, higher level meanings or the creation of a modified mind-set (e.g., thoughts and feelings as "mental events to be considered and examined" versus thoughts as facts). Ultimately, the acceptance of adaptive schemas should override the maladaptive processing.

IMPLEMENTATION

Given the suite of verbal interventions that may be used to change cognitions, each portion, with accompanying steps and suggestions for implementation, is discussed in turn. First, we discuss the importance of collaborative empiricism. Second, we outline how to provide a rationale for using rational discourse. Third, we cover strategies for assessing and monitoring cognitions, and identifying biased or distorted thinking patterns. Finally, we discuss interventions for challenging and modifying faulty cognitions.

Collaborative Empiricism

Collaborative empiricism (Beck, Emery, & Greenberg, 1985) refers to the idea that the patient and therapist make unique contributions to the process of therapy and share responsibility in its direction and outcome. It is the therapist's job to help the patient discover for him- or herself an understanding of how maladaptive thinking patterns contribute to anxiety, as well as the development of more adaptive thinking patterns. In the spirit of teamwork with an emphasis on mutual responsibility, the patient is tasked with openly sharing his or her lived experience and describing the nuance of their his or her situation, while the therapist brings his or her expertise in clinical training to case formulation and the intervention at hand. This includes explaining the therapy model, introducing associated skills, and guiding the patient with frequent feedback. The therapist also assumes responsibility for establishing the treatment rationale, structuring homework assignments, asking questions throughout the therapeutic process, and encouraging the patient to adopt an exploratory stance in investigating his or her closely held beliefs. Jointly, the patient and therapist determine goals for challenging and modifying these cognitions. This strong therapeutic alliance is necessary for fostering engagement and vulnerability in the cognitive restructuring process and becomes particularly important as tasks increase in difficulty.

   Empiricism—the idea that knowledge comes from data and sensory experience—is vital for allowing the patient to strategically test the validity of maladaptive schemas and alternative beliefs. It provides an opportunity for patients to develop self-efficacy by learning about their beliefs via the gathering of experiential evidence, rather than in a didactic format. Empiricism is also important for helping the patient foster tolerance of anxiety by learning firsthand that he or she can withstand subjectively threatening situations.

Rationale

When introducing cognitive restructuring to a patient, the therapist first provides an explanation of the cognitive model (including definitions of core beliefs and automatic thoughts) and outlines the course of treatment. This explanation is delivered using an interactive approach that includes soliciting personal examples from the patient and checking periodically to gauge his or her understanding. This introduction may include the use of diagrams to illustrate the relationship between situations, cognitions, and emotions (i.e., the ABCs) in the context of anxiety (as is also described in Chapter 1). The following is an example:

> Many people believe that their emotions—in your case, anxious feelings—are a direct result of the situations they encounter. But, this is not necessarily the case. In fact, with any *activating event* (A), it is actually your *belief* (B) about that situation that largely determines the *consequences* (C)—how you feel and what you do. Sometimes our thoughts and beliefs about a given situation are mistaken or unhelpful. When this happens, it leads to negative, unproductive, or other irrational emotional and behavioral responses.

The therapist can then provide examples to illustrate this pattern. For example:

> Let's imagine that you've invited a friend for dinner at 7 o'clock. It's now 7:30, but there is no sign of your friend. What might be going through your mind? [The patient provides a variety of assumptions about the situation, such as *he's stuck in traffic, she doesn't care about me, or he's had an accident*.] What emotions would you feel as a result of each assumption? [Patient: *frustration*, *sadness*, and *anxiety*, respectively.] Do you see how what you tell yourself in a given situation predicts the way you feel and probably what you'll do? There are two important take-home messages here: The first is that any situation can have multiple interpretations. The second is that you can control how you *feel* in any situation by controlling how you *view* the situation.

After discussing this point and ensuring that the patient understands the principle, the therapist can explain the concept of core beliefs, intermediate thoughts, and automatic thoughts, using examples to illustrate how anxious cognitions arise from the way people try to make sense of their world and organize their experiences (Beck, 1987). For example:

> Beginning in childhood, people develop ideas about themselves, other people, and their world. We call these *core beliefs* because they're deep, fundamental understandings that seem like "absolute truths" or "the way things are." When these core beliefs are overgeneral and rigid, such as "I'm always socially incompetent," or "it's terrible to make mistakes in front of others," it can cause problems such as social anxiety. Think of how the specific settings on a camera influence the final picture. It's similar with our thinking: What you focus on, frame, and highlight affects what you experience. Then, the editing determines what will be blown up or what will be glossed over. With anxiety, initial impressions or assumptions, such as "everyone in my class is judging me," can influence your actions. Let's talk more about how this applies to you. What are some of the rules and assumptions you have? How might they affect your conclusions about certain situations?

Next, the therapist introduces the idea of shifting away from maladaptive schematic thinking patterns to more rational, adaptive thoughts, which can lead to a more balanced perspective and more pleasant emotions. To this end, it is important to have a sense of the patient's willingness to engage in cognitive restructuring and consider alternative perspectives, as the intervention is not feasible for those who refuse to examine their beliefs. Further, the therapist should highlight that the intervention is often brief (i.e., time limited) and structured with a significant, required, out-of-session commitment (i.e., homework) to reinforce and supplement the work done in the session.

Assessing and Identifying Cognitive Distortions

Verbal cognitive restructuring begins with identifying the patient's core beliefs and automatic thoughts, and teaching the patient to do the same. One useful technique is to ask the patient to recall a recent situation in which he or she felt anxious. The therapist can then guide the patient to identify automatic thoughts by asking questions such as, "What was going through your mind when [situation] happened?" (e.g., "When I heard thunder outside, my first thought was that our house is going to be hit by lightning"). The therapist can then reinforce the connection between beliefs (Bs) and consequences (Cs), such as by stating,

> Anxiety is generated when we perceive a serious threat to ourselves or someone else. Do you see how your thoughts and *beliefs* (Bs) brought about the *consequence* (C) of feeling anxious and fearful over the *activating event* (A) of hearing thunder? The thunder itself doesn't make you anxious—it's your *beliefs about the thunder* that cause these feelings.

With repeated practice recalling automatic thoughts, the therapist can train the patient to observe the A-B-C sequence and highlight the important causal relationship between B and C.

As part of learning about this sequence, as well as to aid with assessment, the patient is asked to systematically self-monitor As, Bs, and Cs between sessions using a log or diary, such as that shown in Figure 16.1. This process helps the patient learn about his or her own automatic thoughts, including identifying common themes that offer clues about more deeply held core beliefs. Importantly, at this step, the therapist does not challenge the validity of the patient's thoughts and beliefs but instead merely observes them. When patients point out the illogic in their own cognitions, however (e.g., "This really sounds absurd when I write it down"), the therapist can reinforce such critical thinking (e.g., "What about that seems absurd to you?").

Once the therapist and patient have a good understanding of the patient's automatic thoughts and core beliefs, and their antecedents and consequences, it is appropriate to lay the foundation for the techniques that will be used to challenge and modify dysfunctional cognitions. This includes discussing how people usually accept their own thoughts, beliefs, and assumptions as true without questioning their logic but recognizing that such cognitions can be

FIGURE 16.1. Thought Log for Self-Monitoring Anxious Situations (with an example)

Date and time	Activating event (A)	Beliefs (B) about the event	Emotional and behavioral consequences (C)
June 11 at 7:30 p.m.	About to leave for the movie theatre on a date.	I will have a panic attack and have to leave. I will cause a scene and embarrass myself. He won't want to be with me.	Anxiety, sweating, thinking about how I can make sure I sit on the aisle.

evaluated according to their validity and their utility. An important point is that the patient will learn to regard thoughts as hypotheses, rather than as facts. Accordingly, the next step of cognitive restructuring involves evaluating the patient's automatic thoughts to determine how accurate and useful they are.

The therapist can then introduce the notion of cognitive distortions by explaining that everyone occasionally makes errors in their thinking but that when they have recurring problems with fear and anxiety, it is usually an indication that they are getting stuck making some consistent mistakes that lead to exaggerated perceptions of threat. Table 16.1 lists *cognitive distortions* (unhelpful thinking patterns) that individuals with clinical anxiety commonly make. The therapist may review this list with patients and ask them about times they have noticed thinking in one or more of these ways (and has identified such distortions in their own thought logs). The patient and therapist can jointly identify these patterns while normalizing the experience by acknowledging that almost everyone (with and without clinical anxiety) makes these thinking mistakes on a daily basis.

Challenging and Modifying Faulty Cognitions

Helping a patient change automatic thoughts and core beliefs, such as those in Table 16.1, requires generating more believable (rational) alternative thoughts and beliefs. Thus, cognitive restructuring focuses on challenging existing maladaptive cognitions by using primarily logical evidence that is inconsistent with the patient's anxiety-based cognitions. Different from exposure therapy, which relies exclusively on experience and direct engagement with fear stimuli to bring about behavioral extinction, cognitive restructuring relies primarily on

TABLE 16.1. Common Anxiety-Related Cognitive Distortions

Thinking error	Definition	Clinical example
All-or-nothing thinking	Seeing things in "black or white" categories	"No one will want to date me because of the scar on my face."
Overgeneralization	Seeing a single negative event as a never-ending pattern	"I had a panic attack while driving, so I will never be able to drive anywhere without panicking."
Mental filter	Exclusively focusing on a negative aspect(s) of a situation	"I ruined the whole party because I made a mistake during my toast speech."
Disqualifying the positive	Rejecting positive experiences by insisting that they do not "count," for one reason or another	"The doctor said there's nothing wrong with me, but medical tests are never 100% accurate."
Jumping to conclusions	Making negative interpretations without adequate evidence	"My friend didn't reply to my text right away, so she must be mad at me."
Catastrophizing	Attributing or anticipating extremely awful consequences to events	"If I fail the exam, it means I'll have to drop out of school and I'll never amount to anything."
Emotional reasoning	Assuming that negative emotions necessarily reflect the situational reality	"I'm anxious, therefore there must be danger."
"Should," "must," or "ought to" statements	Endorsing rigid yet arbitrary rules	"I should be able to control my anxiety."
Labeling and mislabeling	Assigning extremely overgeneralized negative descriptive titles	"I started crying when I saw a spider . . . I'm weak and have no backbone."
Personalization	Interpreting negative events as indicative of some negative characteristic of oneself	"Having thoughts of harming others means I am a bad person."
Maladaptive thoughts	Endorsing thoughts that are not necessarily irrational or distorted but are nevertheless unproductive or unhelpful	"It's not fair that social situations are so much harder for me than for other people."

verbal discussion and disputation of cognitive distortions to bring about cognitive change. Entire volumes have been written on cognitive therapy techniques for anxiety disorders (e.g., Beck et al., 1985). In this chapter, we provide an overview of these procedures, with attention to how they operate mechanistically to promote changes in cognition.

Socratic Questioning

Generally speaking, the Socratic method (so named because it was developed by the Greek philosopher Socrates) is used to help patients challenge and modify anxiety-related cognitions. This method entails asking patients questions to

promote critical thinking that challenges their beliefs, and it may be contrasted with the *didactic method* in which the therapist simply tells a patient how to think. Socratic questions promote cognitive change because they are open-ended queries that give patients the opportunity to actively consider their own thoughts and beliefs and then discover for themselves more adaptive alternatives. Examples include "What do you mean when you say that you will 'never amount to anything'?" and "What evidence do you have for or against the belief that if you failed an exam you could never have a happy or successful life?"

An important feature of effective Socratic questions is that patients have the knowledge to answer them. More specifically, good questions help patients retrieve information (e.g., facts, memories) that is relevant to the issues being discussed, contradictory to their current beliefs, yet outside their current focus. Indeed (and as highlighted in Chapters 1, 11, and 12), patients with anxiety disorders have information-processing biases that lead them to interpret and recall information and memories in ways that confirm their fears. Thus, Socratic questions that require patients to retrieve and process *disconfirmatory* information and memories will optimally promote the reevaluation of existing ideas (and the construction of new ideas), and thus long-term cognitive change. Effective Socratic questioning also moves from the more specific (or concrete) to the more abstract. That is, the therapist first explores a particular situation or belief (e.g., "What thoughts go through your mind when you notice a panic attack coming on?") before using more abstract questions to help the patient learn something, challenge his or her beliefs, or experiment with an idea (e.g., "So, if panic attacks are nothing more than your fight-flight response, what do you think would happen if you had a panic attack but didn't take Xanax?"). In this way, Socratic questions can help generate ideas for further testing beliefs (or for conducting exposure therapy).

Using Objective Evidence

A more structured variant of general Socratic questioning and discussion is to help patients systematically explore evidence for and against their dysfunctional cognitions. As we have alluded to, patients rarely take the time to think critically about their anxiety-related beliefs and assumptions. Thus, considering evidence and "putting beliefs on trial" or "thinking like a scientist" provides a basis for examining their thinking patterns and generating alternative, and more realistic (and adaptive), thoughts and beliefs.

The patient is taught to treat his or her thoughts and beliefs as hypotheses—that is, as *possible* but not forgone conclusions. The therapist and patient then work collaboratively to explore facts from the patient's past experiences and information obtained from other sources (e.g., after surveying peers, the patient concludes that some people don't seem to mind being embarrassed) guided by thought-provoking questions, such as those listed in Exhibit 16.1. The "data" collected when considering these questions are then recorded on a worksheet, such as that shown in Figure 16.2 where it can be laid out for the patient to consider. Following this reflection and discussion, the therapist

EXHIBIT 16.1

Questions to Ask When Putting Dysfunctional Thoughts and Beliefs on Trial

- What evidence do I have for this thought? Against this thought? What would be the worst thing that could happen?
  ◦ And if it happened, what would it mean, or "so what"?
  ◦ What would be so bad about that?
- Do I know for certain that the bad consequence will happen? What is its likelihood?
- Am I confusing a low-probability event with one of high probability?
- How have situations similar to this turned out before?
- Is there any alternative way of looking at the situation? Is there any alternative explanation?
- How would someone else think about the situation? What would I tell a friend about this same situation?
- Are my judgments based on how I felt rather than on what actually happened?
- Am I setting an unrealistic and unobtainable standard for myself?
- Am I forgetting relevant facts or focusing too much on irrelevant facts?
- Is this an example of all-or-nothing thinking?
- Am I overestimating how much control and responsibility I have in this situation?
- Is what happened really so important that my entire future resides with its outcome?
- How will things look, seem, or work months from now? Years from now?
- Am I underestimating what I can do to deal with the problem or situation?
- What are the advantages and disadvantages of thinking this way?

and patient work together to develop a rational response to the maladaptive automatic thought(s) that synthesizes answers to the aforementioned questions and represents an alternative, empirically and logically sound belief. The patient practices this exercise between sessions in order to learn this skill to the point that it becomes habitual—or at least easier to practice in vivo without having to use the worksheet.

Behavioral experiments to further test the validity (or invalidity) of dysfunctional and adaptive thoughts and beliefs are also important for long-term belief change. Such experiments involve planned experiences that provide real-life, concrete demonstrations of the soundness of cognitions. The following is an example of how a behavioral experiment might be used with a patient with heart-focused anxiety and panic attacks:

> Although numerous doctors had assured Grace (age 35) that her heart was quite healthy, she remained concerned that it would "fail" if she exerted herself for more than a few minutes at a time.[1] After helping Grace identify dysfunctional beliefs (e.g., "No doctor has ever been concerned about my heart") and challenge them with more realistic thoughts (e.g., "Physical exertion is good for a healthy heart"), her therapist suggested conducting the next treatment session at a local health club where Grace would practice walking or jogging on a treadmill for gradually increasing periods of time without breaks, and at increasing speeds, to

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[1]All clinical case material has been altered to protect patient confidentiality.

FIGURE 16.2. Worksheet for Recording Cognitive Challenging Practice

Situation	Automatic thoughts and beliefs	Thought challenges	Rational thoughts and beliefs
Taking a trip on an airplane	The plane will crash and I will die	• Air travel is the safest form of travel • I don't seem "unlucky" enough to be in a plane crash • I am confusing the fact that plane crashes are extremely rare for the fact that they're usually catastrophic • You hear about crashes a few times per year, but thousands of flights land safely every day that you don't hear about • The pilots know what they're doing and they want to be safe • My fear comes from the fact that I don't understand how airplanes work • I wouldn't bet on the plane crashing • I tend to mistake my anxious feelings as meaning that danger is likely • Thousands of people fly every day	The risk of a crash is extremely slim, and although I will probably feel anxious on the plane, this does not mean a crash is going to happen. The pilots are experienced and don't want to crash any more than I do.

test her new beliefs and see whether her heart would really fail. After considering the evidence, Grace agreed. Although she initially experienced palpitations during the exercise (due to anxiety and to her being out of shape), she was eventually able to convince herself that she did not need to be so concerned about her heart.

Unlike in exposure therapy, behavioral experiments need not (and often do not) include direct confrontation with fear triggers. Consider Manuel, a university student who was worried that if he got a "poor grade" on an exam he would never fulfill his dream of attending medical school and becoming a doctor. Following a few sessions of cognitive restructuring, Manuel was able to define a "poor grade" as a C or below and acknowledge that his belief about such a grade was indicative of a rigidly held and extremely high standard. Nevertheless, Manuel was having difficulty believing that he could get a C and still attend medical school. To further help him consider alternative, more realistic beliefs, Manuel's therapist asked him to conduct an experiment in which he asked 20 medical school students and 20 physicians whether they had ever received a C or below on an exam in college. Manuel used the

university directory to send e-mails to students and doctors at his university's medical center, asking about their grades. To his great surprise, three quarters of the people he asked responded that they had indeed received a C or below on exams. Some had even failed exams or received one or more C course grades in college. This helped Manuel open his mind to alternative ways of thinking. He was able to take some of the pressure off himself, believing that receiving a poor grade did not necessarily mean he could not attend medical school or become a doctor.

Effective behavioral experiments that foster long-term cognitive change have a clear rationale that the patient understands. Moreover, it is important that the faulty belief and the alternative, rational belief be clearly specified so that it is clear what is being tested (e.g., Manuel defined a "poor grade" as a C or worse). Behavioral experiments are also maximally helpful when the therapist and patient jointly agree on how the beliefs will be tested, plan the exercise together, and decide collaboratively how the experiment's results confirm or refute the patient's hypothesis (e.g., "How will we know if your belief is accurate?"). Behavioral experiments can be completed either within or between therapy sessions but should be carefully and collaboratively reviewed to maximize cognitive change. Readers interested in additional information on behavioral experiments are referred to Bennett-Levy et al. (2004).

OUTCOME INDICATORS

One obvious way to measure effective cognitive change is to assess changes in particular anxiety-related thoughts and beliefs. To assess such changes, therapists can ask patients to quantify catastrophic appraisals of feared stimuli (e.g., "I am 90% certain I will become ill") before initiating cognitive restructuring and compare these pretreatment ratings with revised estimates during and after treatment. An advantage of such ratings is that they are patient specific. Belief ratings alone, however, may lack the sensitivity to track cognitive change because the shift toward adaptive schematic processing is often nonlinear and influenced by circumstances and mood (Clark, 2014). Thus, it is useful to use multiple indicators of cognitive change to measure the effects of cognitive restructuring.

There are a number of reliable and valid self-report measures that assess the presence and strength of dysfunctional beliefs relevant to various anxiety-related disorders and fear domains, many of which are freely available online and in the published literature. Some examples of these are listed in Table 16.2. Such measures can be administered before and after treatment to track changes in dysfunctional cognitions. It is important to note, however, that the treatment of anxiety often involves the simultaneous use of cognitive and behavioral components that have effects on cognition. As a result, it may be challenging to disentangle the specific outcomes of cognitive restructuring from those of interventions such as exposure therapy.

TABLE 16.2. Common Self-Report Measures of Dysfunctional Cognitions Relevant to Different Anxiety-Related Conditions

Dysfunctional cognition and measure name	Source
Specific phobia	
Spider Phobia Beliefs Questionnaire	Arntz, Lavy, Van den Berg, and Van Rijsoort (1993)
The Claustrophobia Questionnaire	Radomsky, Rachman, Thordarson, McIsaac, and Teachman (2001)
Agoraphobic Cognitions Questionnaire	Chambless, Caputo, Bright, and Gallagher (1984)
Dental Anxiety Inventory	Stouthard, Mellenbergh, and Hoogstraten (1993)
Social anxiety	
Social Cognitions Questionnaire	Wells, Stopa, and Clark (1993)
Beliefs About Appearance Scale	Spangler and Stice (2001)
Obsessive-compulsive disorder	
Obsessive Beliefs Questionnaire-44	Steketee and Obsessive Compulsive Cognitions Working Group (2005)
Interpretation of Intrusions Inventory	Steketee and Obsessive Compulsive Cognitions Working Group (2005)
Contamination Cognitions Scale	Deacon and Olatunji (2007)
Panic and health anxiety	
Anxiety Sensitivity Inventory-3	Taylor et al. (2007)
Traumatic events and posttraumatic sequelae	
Posttraumatic Cognitions Inventory	Foa, Ehlers, Clark, Tolin, and Orsillo (1999)

EMPIRICAL SUPPORT

Studies on the effects of cognitive restructuring, often termed *cognitive therapy*, for anxiety have, for the most part, evaluated this mechanism of change as a monotherapy or in comparison with exposure therapy. Indeed, a meta-analysis found that cognitive therapy was as effective as exposure for posttraumatic stress disorder (PTSD), obsessive-compulsive disorder (OCD), and panic disorder and was significantly more effective than exposure for social anxiety disorder across several studies (Ougrin, 2011). Other studies have examined whether cognitive therapy adds to the efficacy of exposure.

   Although studies suggest that cognitive restructuring alone leads to a significant reduction in panic-related symptoms (e.g., Bouchard et al., 1996; Margraf & Schneider, 1991), cognitive restructuring does not appear to add significantly to the efficacy of exposure therapy for panic (Öst, Thulin, & Ramnerö, 2004; Van den Hout, Arntz, & Hoekstra, 1994). Cognitive restructuring may be more critical to social anxiety treatment, as some studies show that it augments the effects of exposure therapy (e.g., Mattick & Peters, 1988; Mattick, Peters, & Clarke, 1989). Cognitive restructuring also appears to be an efficacious monotherapy for OCD (e.g., Wilson & Chambless, 2005). Moreover,

whereas some studies have found cognitive therapy and exposure and response prevention (ERP) to produce equivalent results (Cottraux et al., 2001; Whittal, Thordarson, & McLean, 2005), cognitive interventions do not appear to add significantly to the efficacy of ERP (see Abramowitz, Taylor, & McKay, 2005).

Considerable research has explored the potential additive properties of cognitive restructuring for PTSD. In a systematic review, Ponniah and Hollon (2009) concluded that CBT that included exposure or cognitive restructuring was efficacious for PTSD. Marks, Lovell, Noshirvani, Livanou, and Thrasher (1998) found that both prolonged exposure and cognitive restructuring were therapeutic for PTSD but were not mutually enhancing when combined. Foa and Rauch (2004) found that the addition of cognitive restructuring did not enhance treatment outcome for PTSD, and these results were later replicated by Foa and colleagues (2005). As a result, some researchers have concluded that cognitive interventions are unnecessary for PTSD treatment (see Longmore & Worrell, 2007).

Some studies have used mediation analyses to determine whether cognitive change precedes fear reduction during treatment, which would suggest that cognitive change is a key mechanism of change in anxiety disorders. Hofmann (2004), for example, found that change in beliefs about social events preceded reductions in social anxiety symptoms. Smits, Rosenfield, McDonald, and Telch (2006) found that reductions in likelihood estimations predicted self-reported fear during exposure. Similarly, Hofmann and colleagues (2007) demonstrated that change in catastrophic thoughts was a significant mediator of change in panic symptoms for individuals receiving CBT. Finally, working with patients with OCD, Woody, Whittal, and McLean (2011) found that beliefs about obsessional thoughts significantly accounted for improvement in symptoms. These findings were supported by a systematic review conducted by Smits, Julian, Rosenfield, and Powers (2012), who found that change in threat appraisal was causally related to reduction in fear. However, despite mediation analyses suggesting a relationship between cognitive change and symptom reduction, the question of temporal precedence remains unanswered. Although some studies suggest that cognitive change precedes symptom change, others position cognitive change as a consequence of symptom change, and still others demonstrate a co-occurring change with bidirectional effects (Clark, 2014).

Results from the studies just mentioned are mixed, and the vast majority examine treatment efficacy in diagnostically homogenous (i.e., disorder-specific) groups. In their review of CBT studies with varying methodologies, Longmore and Worrell (2007) argued that there is insufficient evidence to conclude that cognitive restructuring adds therapeutic value beyond exposure-based interventions. While the majority of treatment outcome studies compare symptoms before and immediately after treatment, longer term follow-up data, when available, can provide additional information about the importance of cognitive restructuring. For example, Hofmann (2004) found that although full CBT (which included cognitive restructuring) and exposure without cognitive restructuring led to comparable symptom improvement at posttreatment,

only patients who received cognitive restructuring continued to improve after the end of treatment. This suggests that the cognitive component of anxiety treatment supports long-term gains; thus, the most significant contribution of cognitive interventions for anxiety may lie in conferring more enduring treatment.

TROUBLESHOOTING

A common objection to cognitive restructuring is that it is "too intellectual." Although therapists can address this objection by reducing their use of jargon and using Socratic questioning to allow the patient to guide the conversation, cognitive restructuring does rely on verbal communication and abstract thought. Thus, patients with intellectual and/or developmental deficits, as well as problems that affect cognition—such as substance use disorders, psychotic disorders, organic brain syndromes, and neurodevelopmental disorders—may require support beyond traditional cognitive restructuring strategies. Some also criticize the "unemotional" nature of cognitive restructuring given its emphasis on objectivity and rational thought. Critics suggest that therapy sessions should include more emotional processing and validation, and argue that cognitive restructuring is a superficial solution that does not address deeper problems. Cognitive restructuring, however, starts with the identification of emotion, and the goal of changing thought patterns is ultimately to help cope with emotion and reduce anxiety.

Some patients are strongly convinced of their core beliefs, so it may be challenging to provoke a shift in thinking patterns. Therapists must be cautious about imposing their own value systems on the patient. For example, the use of a term such as *maladaptive thoughts* might be avoided unless the patient and therapist agree on the utility of the expression. Moreover, cognitive restructuring often requires patients to disclose thoughts and emotions that are highly personal. Therapists can address reluctance to self-disclose by reiterating confidentiality and reminding patients that they will not be criticized or negatively judged. Alternatively, some patients may share too much information and have trouble staying on track. Therapists must be clear about the expectations of cognitive therapy (e.g., the conversation will be structured by the ABC model). Particularly talkative patients may benefit from having a few minutes at the beginning or end of each session for less structured conversation.

Homework noncompliance can interfere with treatment, given the importance of practicing cognitive restructuring outside of therapy sessions. Therapists must be sure to emphasize the importance of homework and consistently assign and review assignments (Ledley, Marx, & Heimberg, 2011). Patients may also benefit from positive reinforcement for completing homework assignments. Finally, patients who struggle with perfectionism may avoid homework assignments due to fear of doing them imperfectly, and other patients who dislike school or academics may balk at the idea of completing homework

as part of their therapy. Therapists can emphasize that homework (or out-of-session practice) is not graded or judged but rather used to cement in-session learning.

CONCLUSION

Changes in beliefs may occur as a result of various therapeutic procedures, including exposure therapy and behavioral activation. The present chapter focused on cognitive change resulting from verbal rational disputation of dysfunctional thinking patterns. This mechanism of change involves a systematic process of identifying, appraising, challenging, and modifying the sorts of maladaptive cognitions that maintain clinical anxiety. Such cognitive restructuring constitutes a core component of CBT for a variety of presentations of clinical anxiety that involve overestimates of the likelihood and severity of threat, as well as underestimates of one's ability to cope with adversity and the very experience of anxiety. There is a great deal of empirical support for cognitive change via rational discussion, yet therapists often make use of this change process alongside other processes, such as extinction, within multi-component therapy programs. This chapter also addressed ways of measuring outcomes, as well as common obstacles to implementing cognitive restructuring.

REFERENCES

Abramowitz, J. S., Taylor, S., & McKay, D. (2005). Potentials and limitations of cognitive treatments for obsessive-compulsive disorder. *Cognitive Behaviour Therapy*, *34*, 140–147. http://dx.doi.org/10.1080/16506070510041202

Arntz, A., Lavy, E., Van den Berg, G., & Van Rijsoort, S. (1993). Negative beliefs of spider phobics: A psychometric evaluation of the spider phobia beliefs questionnaire. *Advances in Behaviour Research and Therapy*, *15*, 257–277. http://dx.doi.org/10.1016/0146-6402(93)90012-Q

Beck, A. T. (1987). Cognitive models of depression. *Journal of Cognitive Psychotherapy*, *1*, 5–37.

Beck, A. T. (1996). Beyond belief: A theory of modes, personality, and psychopathology. In P. M. Salkovskis (Ed.), *Frontiers of cognitive therapy* (pp. 1–25). New York, NY: Guilford Press.

Beck, A. T., Emery, G., & Greenberg, R. (1985). *Anxiety disorders and phobias: A cognitive perspective*. New York, NY: Basic Books.

Bennett-Levy, J., Butler, G., Fennell, M., Hackmann, A., Meuller, M., & Westbrook, D. (2004). *Oxford guide to behavioural experiments in cognitive therapy*. New York, NY: Oxford University Press. http://dx.doi.org/10.1093/med:psych/9780198529163.001.0001

Bouchard, S., Gauthier, J., Laberge, B., French, D., Pelletier, M.-H., & Godbout, C. (1996). Exposure versus cognitive restructuring in the treatment of panic disorder with agoraphobia. *Behaviour Research and Therapy*, *34*, 213–224. http://dx.doi.org/10.1016/0005-7967(95)00077-1

Chambless, D. L., Caputo, G. C., Bright, P., & Gallagher, R. (1984). Assessment of fear of fear in agoraphobics: The body sensations questionnaire and the agoraphobic cognitions questionnaire. *Journal of Consulting and Clinical Psychology*, *52*, 1090–1097. http://dx.doi.org/10.1037/0022-006X.52.6.1090

Clark, D. A. (2014). Cognitive restructuring. In S. G. Hofmann (Ed.), *The Wiley hand-book of cognitive behavioral therapy* (pp. 1–22). Sussex, England: Wiley and Sons.

Cottraux, J., Note, I., Yao, S. N., Lafont, S., Note, B., Mollard, E., . . . Dartigues, J.-F. (2001). A randomized controlled trial of cognitive therapy versus intensive behavior therapy in obsessive compulsive disorder. *Psychotherapy and Psychosomatics*, *70*, 288–297. http://dx.doi.org/10.1159/000056269

Deacon, B., & Olatunji, B. O. (2007). Specificity of disgust sensitivity in the prediction of behavioral avoidance in contamination fear. *Behaviour Research and Therapy*, *45*, 2110–2120. http://dx.doi.org/10.1016/j.brat.2007.03.008

Ellis, A. (1962). *Reason and emotion in psychotherapy*. Oxford, England: Lyle Stuart.

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The posttraumatic cognitions inventory (PTCI): Development and validation. *Psychological Assessment*, *11*, 303–314. http://dx.doi.org/10.1037/1040-3590.11.3.303

Foa, E. B., Hembree, E. A., Cahill, S. P., Rauch, S. A., Riggs, D. S., Feeny, N. C., & Yadin, E. (2005). Randomized trial of prolonged exposure for posttraumatic stress disorder with and without cognitive restructuring: Outcome at academic and community clinics. *Journal of Consulting and Clinical Psychology*, *73*, 953–964. http://dx.doi.org/10.1037/0022-006X.73.5.953

Foa, E. B., & Rauch, S. A. (2004). Cognitive changes during prolonged exposure versus prolonged exposure plus cognitive restructuring in female assault survivors with posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology*, *72*, 879–884. http://dx.doi.org/10.1037/0022-006X.72.5.879

Hofmann, S. G. (2004). Cognitive mediation of treatment change in social phobia. *Journal of Consulting and Clinical Psychology*, *72*, 392–399. http://dx.doi.org/10.1037/0022-006X.72.3.392

Hofmann, S. G., Meuret, A. E., Rosenfield, D., Suvak, M. K., Barlow, D. H., Gorman, J. M., . . . Woods, S. W. (2007). Preliminary evidence for cognitive mediation during cognitive-behavioral therapy of panic disorder. *Journal of Consulting and Clinical Psychology*, *75*, 374–379. http://dx.doi.org/10.1037/0022-006X.75.3.374

Ledley, D. R., Marx, B. P., & Heimberg, R. G. (2011). *Making cognitive-behavioral therapy work: Clinical process for new practitioners*. New York, NY: Guilford Press.

Longmore, R. J., & Worrell, M. (2007). Do we need to challenge thoughts in cognitive behavior therapy? *Clinical Psychology Review*, *27*, 173–187. http://dx.doi.org/10.1016/j.cpr.2006.08.001

Margraf, J., & Schneider, S. (1991, November). *Outcome and active ingredients of cognitive-behavioral treatments for panic disorder*. Paper presented at the 25th annual meeting of the Association for the Advancement of Behavior Therapy, New York, NY.

Marks, I., Lovell, K., Noshirvani, H., Livanou, M., & Thrasher, S. (1998). Treatment of posttraumatic stress disorder by exposure and/or cognitive restructuring: A controlled study. *Archives of General Psychiatry*, *55*, 317–325. http://dx.doi.org/10.1001/archpsyc.55.4.317

Mattick, R. P., & Peters, L. (1988). Treatment of severe social phobia: Effects of guided exposure with and without cognitive restructuring. *Journal of Consulting and Clinical Psychology*, *56*, 251–260. http://dx.doi.org/10.1037/0022-006X.56.2.251

Mattick, R. P., Peters, L., & Clarke, J. C. (1989). Exposure and cognitive restructuring for social phobia: A controlled study. *Behavior Therapy*, *20*(1), 3–23. http://dx.doi.org/10.1016/S0005-7894(89)80115-7

Öst, L.-G., Thulin, U., & Ramnerö, J. (2004). Cognitive behavior therapy vs exposure in vivo in the treatment of panic disorder with agoraphobia. *Behaviour Research and Therapy*, *42*, 1105–1127. http://dx.doi.org/10.1016/j.brat.2003.07.004

Ougrin, D. (2011). Efficacy of exposure versus cognitive therapy in anxiety disorders: Systematic review and meta-analysis. *BMC Psychiatry*, *11*, 200. http://dx.doi.org/10.1186/1471-244X-11-200

Ponniah, K., & Hollon, S. D. (2009). Empirically supported psychological treatments for adult acute stress disorder and posttraumatic stress disorder: A review. *Depression and Anxiety*, *26*, 1086–1109. http://dx.doi.org/10.1002/da.20635

Radomsky, A. S., Rachman, S., Thordarson, D. S., McIsaac, H. K., & Teachman, B. A. (2001). The claustrophobia questionnaire. *Journal of Anxiety Disorders*, *15*, 287–297. http://dx.doi.org/10.1016/S0887-6185(01)00064-0

Smits, J. A., Julian, K., Rosenfield, D., & Powers, M. B. (2012). Threat reappraisal as a mediator of symptom change in cognitive-behavioral treatment of anxiety disorders: A systematic review. *Journal of Consulting and Clinical Psychology*, *80*, 624–635. http://dx.doi.org/10.1037/a0028957

Smits, J. A., Rosenfield, D., McDonald, R., & Telch, M. J. (2006). Cognitive mechanisms of social anxiety reduction: An examination of specificity and temporality. *Journal of Consulting and Clinical Psychology*, *74*, 1203–1212.

Spangler, D. L., & Stice, E. (2001). Validation of the beliefs about appearance scale. *Cognitive Therapy and Research*, *25*, 813–827. http://dx.doi.org/10.1023/A:1012931709434

Steketee, G., & Obsessive Compulsive Cognitions Working Group. (2005). Psychometric validation of the obsessive belief questionnaire and interpretation of intrusions inventory—Part 2: Factor analyses and testing of a brief version. *Behaviour Research and Therapy*, *43*, 1527–1542. http://dx.doi.org/10.1016/j.brat.2004.07.010

Stouthard, M. E., Mellenbergh, G. J., & Hoogstraten, J. (1993). Assessment of dental anxiety: A facet approach. *Anxiety, Stress & Coping: An International Journal*, *6*(2), 89–105. http://dx.doi.org/10.1080/10615809308248372

Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., . . . Cardenas, S. J. (2007). Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3. *Psychological Assessment*, *19*, 176–188. http://dx.doi.org/10.1037/1040-3590.19.2.176

Teasdale, J. D., & Barnard, P. J. (1993). *Affect, cognition and change: Remodeling depressive thought*. Hillsdale, NJ: Lawrence Erlbaum.

Van den Hout, M., Arntz, A., & Hoekstra, R. (1994). Exposure reduced agoraphobia but not panic, and cognitive therapy reduced panic but not agoraphobia. *Behaviour Research and Therapy*, *32*, 447–451. http://dx.doi.org/10.1016/0005-7967(94)90008-6

Wells, A., Stopa, L., & Clark, D. M. (1993). *The social cognitions questionnaire*. Unpublished manuscript, Department of Psychiatry, University of Oxford, Warnerford Hospital, Oxford, England.

Whittal, M. L., Thordarson, D. S., & McLean, P. D. (2005). Treatment of obsessive-compulsive disorder: Cognitive behavior therapy vs. exposure and response prevention. *Behaviour Research and Therapy*, *43*, 1559–1576. http://dx.doi.org/10.1016/j.brat.2004.11.012

Wilson, K. A., & Chambless, D. L. (2005). Cognitive therapy for obsessive-compulsive disorder. *Behaviour Research and Therapy*, *43*, 1645–1654. http://dx.doi.org/10.1016/j.brat.2005.01.002

Woody, S. R., Whittal, M. L., & McLean, P. D. (2011). Mechanisms of symptom reduction in treatment for obsessions. *Journal of Consulting and Clinical Psychology*, *79*, 653–664. http://dx.doi.org/10.1037/a0024827

17

Behavioral Activation

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Behavioral models of depression (e.g., Lewinsohn, 1974) posit that depression results from a loss or lack of rewarding behavior (i.e., response-contingent positive reinforcement) in the environment and/or high rates of punished behavior (Lewinsohn, 1974; Lewinsohn, Sullivan, & Grosscup, 1980). From this theory, Lewinsohn and colleagues (1980) developed an intervention for depression with the primary goal of promoting *behavioral activation* (BA). Treatments that capitalize on the mechanism of BA aim to decrease a patient's avoidant behaviors and increase opportunities for the patient to contact potential reinforcers. To this end, a therapist might foster BA by helping a patient engage in activities that engender a sense of enjoyment (e.g., going to the park with one's child) and/or mastery (e.g., submitting a job application). Although several variants of BA-focused treatments exist (see Kanter et al., 2010), the therapeutic cornerstones include (a) daily monitoring of mood and of activities, which helps the patient understand the connection between mood and activity, and (b) daily activity planning, which increases the frequency of important and/or pleasurable activities.

Compared with exposure therapy, which focuses on facilitating extinction via habituation of fear (see Chapter 14) and/or inhibitory learning (see Chapter 15), BA-focused interventions emphasize the patient's values and feelings of enjoyment and mastery related to scheduled activities. Accordingly, there is less focus on persisting in situations that engender distress when targeting BA. In fact, the patient and the therapist may drift

from activities that elicit anxiety (or anxious arousal) altogether to incorporate activities that are merely enjoyable or valued to increase BA.

SIMILARITIES BETWEEN BEHAVIORAL ACTIVATION–BASED TREATMENTS AND EXPOSURE-BASED TREATMENTS

BA-focused treatments for depression have significant theoretical and practical overlap with behavioral interventions for anxiety (i.e., exposure therapy; see Table 17.1). Increasing approach behaviors toward avoided activities, a core feature of BA, is mirrored in exposure therapy for anxiety, in which patients confront anxiety-provoking situations without engaging in escape or avoidance behaviors (see Chapter 2). In the same way that exposure is designed to challenge mistaken beliefs about threat and/or anxiety, scheduled activities in BA-focused interventions aim to contradict the expectation of a patient with depression that an activity will be unrewarding or punishing. Furthermore, BA- and exposure-based therapies implicate avoidance (e.g., withdrawal, inactivity, isolation) as a primary mechanism involved in symptom maintenance. Eliminating such maladaptive avoidance behaviors is a core feature of both types of interventions. Given this fundamental conceptual overlap, some transdiagnostic protocols incorporate activity scheduling as "positive emotional exposures" and have been shown to effectively reduce symptoms of anxiety and depression (e.g., Bunnell & Gros, 2017; Gros, 2014).

ADVANTAGES OF INCREASING BEHAVIORAL ACTIVATION DURING ANXIETY TREATMENT

In addition to conceptual overlap between BA- and exposure-based therapies, there are practical reasons that increasing BA may be incrementally useful when treating patients with clinical anxiety. Among these reasons,

TABLE 17.1. Common Features of Behavioral Activation and Exposure Therapies

Features	Behavioral activation therapy	Exposure therapy
Reduce avoidance	✓	✓
Increase approach behaviors	✓	✓
Schedule and monitor activity	✓	✓
Track mood/affect changes in relationship with behaviors	✓	✓
Design activities that contradict mistaken/ maladaptive expectations	✓	✓
Promote development of approach behaviors using a values or goals framework	✓	
Emphasize values and/or reward of activities	✓	
Remain in situation until planned end of activity		✓
In-session practice/exposure		✓
Out-of-session practice/homework	✓	✓

depression is highly comorbid with anxiety and may attenuate response to exposure-based treatment for anxiety (Abramowitz, Franklin, Street, Kozak, & Foa, 2000; Crino & Andrews, 1996). As such, treatment strategies that can target anxiety and depression concurrently represent an opportunity to improve treatment outcomes for this population (Gros, 2014; Gros, Price, Magruder, & Frueh, 2012).

A second advantage regards the emphasis of BA-focused interventions on generating self-sustained approach behaviors (i.e., activities) through positive reinforcement. Exposure therapy sustains approach behaviors primarily through helping patients learn that situations are less threatening than anticipated, while simultaneously extinguishing avoidant safety behaviors previously maintained via negative reinforcement. Within a values-based BA framework (and consistent with other therapeutic approaches like acceptance and commitment therapy; Hayes, Strosahl, & Wilson, 2011), a patient may be more likely to implement and continue engaging with therapeutic activities to the extent that such reinforcing behaviors are in line with personal values rather than arbitrarily selected (e.g., Lejuez, Hopko, Acierno, Daughters, & Pagoto, 2011). A patient with clinical anxiety may be more motivated to engage in exposure tasks if the activities are reinforcing and/or personally important, in addition to facilitative of habituation (see Chapter 14, this handbook) and/or inhibitory learning (Chapter 15, this handbook).

IMPLEMENTATION

After a series of studies underscored the superiority of behavioral, relative to cognitive, interventions in the treatment of depression (Ekers et al., 2014; Gortner, Gollan, Dobson, & Jacobson, 1998), Jacobson and colleagues (1996) developed a manualized treatment for depression that centered around the concept of BA. Jacobson's behavioral activation program (JBA) involved up to 24 sessions delivered over a 16-week period (Dimidjian et al., 2006; Martell, Addis, & Jacobson, 2001). A second independent research program concurrently developed another BA-focused intervention (i.e., brief BA treatment for depression [BATD]; Lejuez, Hopko, & Hopko, 2001; Lejuez et al., 2011). Compared with JBA, BATD is brief (typically eight to 12 sessions, though as few as five) and has more frequently been tested in samples of depressed patients with co-occurring psychological and physical conditions (Gros, Price, Magruder, & Frueh, 2012; Hopko et al., 2011; Hopko, Lejuez, & Hopko, 2004; Hopko, Lejuez, Ryba, Shorter, & Bell, 2016; MacPherson, Collado, Lejuez, Brown, & Tull, 2016; Magidson et al., 2011). BATD also diverges from JBA in that it takes a values-driven approach to selecting scheduled activities.

The next session discusses how the therapist may capitalize on BA when working with a patient with clinical anxiety. Rather than focusing on a specific treatment manual, features common to multiple BA-focused interventions are described in the context of anxiety disorder treatment.

Therapist Role

BA-focused interventions are directive, collaborative, and structured. The therapist and the patient work together to explore a theory-based account of the patient's symptoms, as well as the behavioral steps predicted to resolve them. As in traditional exposure-based interventions, the therapist fosters the patient's independence by fading from a directive and structured style and gradually promoting patient responsibility and initiative. This builds patient autonomy, which is important for maintaining treatment gains and preventing relapse.

Functional Analysis and Self-Monitoring

It is useful to begin by conducting a functional analysis to identify the ABCs of avoidance—antecedents (i.e., "triggers"), behaviors, and consequences (Ramnerö & Törneke, 2008). For an individual with anxiety, avoidance may be so longstanding that he or she considers it normal behavior. It may be equally challenging for a patient with ingrained avoidance to recognize the specific antecedents and consequences of avoidant behavior.

Daily monitoring of behavior and mood is a cornerstone of psychotherapies that capitalize on the mechanism of BA. Tracking the intensity of anxiety (and other relevant positive or negative affect) during activities allows the patient to understand the relationship between behavior and mood, as well as changes in mood over time because of changes in behavior. Given the ubiquity of the subjective units of distress scale (SUDS; Wolpe, 1969) in anxiety treatments, integrating SUDS (or 0–100 scales for other emotions) provides an efficient means of tracking the effects of increased BA on mood. Exposure therapy programs that deemphasize SUDS (e.g., Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014) often ask a patient with anxiety to identify and rate expectations about the outcome(s) of an exposure task; such ratings may be easily integrated into BA-related daily monitoring.

Activity Scheduling

When seeking to increase BA among patients with clinical anxiety, it is important to select activities that not only engender a sense of pleasure or accomplishment (Lejuez et al., 2001) but that also elicit distress. Ranking valued activities on the basis of anxiety and/or fearful avoidance is one way to ensure that activities stand to reduce anxiety symptoms. Consistent with the clinical convention of gradually progressing up a fear hierarchy during exposure, most BA-focused treatment approaches recommend having the patient start by scheduling a few activities that are easy to complete to achieve early momentum prior to increasing the difficulty or frequency of scheduled activities (e.g., Lejuez et al., 2011). Other treatments that target the principle of BA begin with several activities to foster dramatic change and highlight the contrast between activity and inactivity (e.g., Gros, 2014).

Areas of avoidance and potential activities to schedule may be more easily identified by dividing the patient's varied environment into specific contexts. For example, Lejuez and colleagues (2011) provide a framework of life areas that include discrete contexts like relationships, education/career, and hobbies/recreation. Constructing a hierarchy of avoided situations in different life areas can be helpful for organizing a comprehensive list to promote BA (and fear extinction).

Considerations for Specific Disorders

Avoidance is a common maintenance factor in anxiety and related disorders, but avoidance and other symptoms can manifest differently across diagnostic categories. Considerations to guide the application of BA to specific diagnoses are provided next.

Social Anxiety Disorder

In many cases, social anxiety disorder involves a withdrawal from social situations. Many patients will be able to identify a mismatch between valuing social relationships and their withdrawal from others. If this is the case, motivation to engage in social activities may be built by identifying and discussing the patient's relationship values and goals.

Social skills training is not unique to BA-focused treatments, nor included in all BA-focused treatment manuals. However, including social skills training complements theoretical models of BA. For example, participation in social activities may not be therapeutic if the patient lacks the necessary skills to behave in ways that others will reinforce (Lewinsohn, 1974). For this reason, social skills training through therapist modeling, role-play, and feedback is included in the treatment program developed by Martell and colleagues (2001).

Generalized Anxiety Disorder

Given the high comorbidity of unipolar mood disorders and generalized anxiety disorder (Moffitt et al., 2007), as well as initial evidence that BA-focused treatments for depression produce improvements in co-occurring anxiety disorder symptoms (Hopko et al., 2004), it may be appropriate to target BA in the context of generalized anxiety disorder. With respect to anxiety symptoms, increasing BA may help the patient engage in potentially rewarding behaviors he or she avoids because of worry. Furthermore, focused engagement in activities may counter worry by giving the patient something else on which to focus his or her attention (Bunnell & Gros, 2017). Accordingly, behavioral activation for worry, an 8-session group treatment (Chen, Liu, Rapee, & Pillay, 2013), aims to increase activities that contradict specific worries.

Posttraumatic Stress Disorder

Increasing BA may be especially useful in the context of treatment for posttraumatic stress disorder (PTSD), given the anhedonic features of this condition (e.g., markedly diminished interest or participation in significant

activities). Exposure to memories of traumatic events is a common feature of evidence-based treatments for PTSD. This may be done through a detailed reimagining of the event (i.e., imaginal exposure), as in prolonged exposure (Foa, Hembree, & Rothbaum, 2007) or through writing out details of the event, as in cognitive processing therapy (Resick & Schnicke, 1993). Although BA-specific interventions for depression do not include an analogue to these strategies, limited data suggest that BA treatment programs (with or without imaginal exposure) are effective in reducing PTSD symptoms (e.g., Gros, Price, Strachan, et al., 2012; Hershenberg, Smith, Goodson, & Thase, 2018; Jakupcak et al., 2006; Strachan, Gros, Ruggiero, Lejuez, & Acierno, 2012). Nevertheless, imaginal exposure can easily be integrated into treatment plans centered around increasing BA.

Obsessive-Compulsive Disorder

Preventing avoidance behaviors (i.e., compulsive rituals or other safety behaviors) is a critical component of successful treatment for obsessive-compulsive disorder. For example, a patient with obsessions related to cleanliness who is encouraged to go for a hike without using antibacterial gel may only comply or withstand the exposure by subtly wiping his hands on his clothing. Yet, if the therapist facilitates response prevention by incorporating an activity that has the potential to be maximally rewarding (e.g., prevent ritualistic hand wiping by walking outside while giving a beloved child a "piggyback ride"), the patient may be better able to fully engage in an exposure task that challenges anxiety-driven avoidance. Accordingly, the therapist is encouraged to assess for a range of avoidance and safety behaviors (as well as potential barriers to full response prevention) and design exposure activities accordingly.

Specific Phobias

The features that distinguish BA- and exposure-based therapies may be especially evident in the treatment of specific phobias. Specific phobias typically present with the clearest situational fear/avoidance and the least overlap with symptoms of depression, suggesting that it may not be necessary to target BA in this population (Gros, McCabe, & Antony, 2013). In addition, treatments for specific phobia are straight-forward and effective, further limiting the incremental utility of targeting BA in treatment (Gros & Antony, 2006).

Considerations for Special Populations

Certain issues should be considered when targeting BA in different populations. For example, a patient with chronic pain may struggle to distinguish between maladaptive inactivity and reasonable withholding from activities that exacerbate pain. Indeed, an energetic dive into new activities may result in a highly punishing increase in pain. Activity selection should be in accord with each patient's physical limitations. A patients with chronic pain may need guidance to recognize objective health indicators (e.g., presence of a

migraine) to distinguish when increasing activation is appropriate versus temporarily contraindicated.

The therapist should also consider the patient's cultural values when selecting activities to incorporate into treatment (see Lejuez et al., 2011) rather than assume that the patient exists in the same multicultural context as the therapist or other patients. The role of the patient's culture can be incorporated into functional analysis; moreover, antecedents can be classified as distal versus proximal. Distal antecedents include the patient's upbringing and culture, which are not easily amenable to change. Proximal antecedents are those which exist in the "here and now," and can be targeted during treatment. Because treatments that act on BA focus on increasing values-guided adaptive behaviors, a patient can select behaviors that are consistent with his or her personal beliefs, reducing the risk that the therapist will impose values that are inconsistent with the patient's values.

Incorporating Partners and Family Members

As family members and partners are part of a patient's context, it is important for the therapist to ensure that the patient's loved ones are facilitators rather than barriers to treatment goals. It may be helpful to ask the patient to track who is present during scheduled activities and whether this person's presence is energizing or depleting during the activity. Tracking this detail can enable the therapist and the patient to adjust activities considering the realities of the patient's interpersonal context. Critical family members can be encouraged to focus on (and reinforce) the patient's efforts toward change (Lejuez et al., 2001). Within BATD, the patient and family complete contracts so that family behaviors reinforce the patient's adaptive behaviors rather than the patient's avoidance.

Because BA-focused treatments can stall when a patient falls into a pattern of failing to complete scheduled activities, family members and friends can be enlisted to assist the patient's homework compliance. One strategy is to encourage the patient to voluntarily obligate himself or herself to complete an activity with family members or friends. If necessary, the patient can call and schedule activities that incorporate others during the session.

Case Example: Ricky

The following case example illustrates how a therapist might conceptualize behavioral avoidance as well as implement treatment strategies to increase BA within the context of treatment for clinical anxiety.

Ricky is a single, 20-year-old man living with his parents.[1] Ricky stopped attending college classes because of anxiety about being negatively evaluated by his peers and instructors. He was also fired from a series of part-time jobs

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[1]All clinical case material has been altered to protect patient confidentiality.

after absenteeism and failing to interact with customers. Ricky has few friends and spends most of his time at home playing video games, watching television, and playing with the family dog, whom he describes as "his best friend." A diagnostic assessment suggests that Ricky meets criteria for social anxiety disorder. In Ricky's case there is no clear deficit in social skills; therefore, social skills training is not indicated prior to activity scheduling.

In the first session, the therapist worked collaboratively with Ricky to understand his social anxiety symptoms as well as the role that Ricky's avoidance plays in maintaining his symptoms. Using functional analysis, the therapist guided Ricky in identifying how his environment triggers avoidance behaviors and the function (positive consequences) and dysfunction (negative consequences) of these behaviors (see Table 17.2). The therapist discussed the treatment plan with Ricky, checking for his understanding, agreement, and commitment to treatment. Ricky was given a self-monitoring form and asked to track his daily activities.

In the second session, Ricky identified his personal values in various life areas. Among other values, Ricky likes to be good at what he does and likes to help others. The therapist guided Ricky to keep such values in mind while creating a hierarchy of avoided activities to be attempted during anxiety treatment (see Table 17.3). Ricky used to enjoy going to eat with friends, but he avoids this now because of anxiety about being judged by them. Using this hierarchy, the therapist worked with Ricky to select two social activities per day that are consistent with Ricky's values (e.g., meet a close friend for coffee in the morning, have a phone call with a different friend in the evening).

Throughout the course of therapy, Ricky routinely completed several social activities (e.g., window-shopping at the mall with a friend, attending church) while failing to complete others (e.g., attending class). Though Ricky achieved some treatment gains, Ricky and his therapist believed that his progress had hit a wall. Further discussion revealed that Ricky feels incompetent in class, and that this is related to uncompleted coursework. Ricky decided to add completion of coursework and attending a study group to his activity list.

By the end of therapy, Ricky generally felt that he had achieved his treatment goals and increased his social behaviors. Not only does Ricky have

TABLE 17.2. Functional Analysis for a Patient With Social Anxiety Disorder

Antecedent	Avoidance behavior	Positive consequence	Negative consequence
Class time approaching	Playing video games	Distracted from anxiety about class	Missing class, falling further behind in class
Dinner time approaching	Eating in the basement, playing with dog	Avoided parental criticism	Isolation from parents, feelings of loneliness
Thinking about needing a job/ruminating about past jobs	Watching a movie, playing video games	Distracted from anxiety about job	Remaining unemployed, isolation from others

TABLE 17.3. Hierarchy of Fear/Avoidance for a Patient With Social Anxiety Disorder

Activity	Fear/ anxiety	Avoidance	Value	Enjoyment	Mastery
Eating dinner with parents	7	8	5	2	0
Attending class	8	9	8	6	7
Applying for jobs	9	9	6	4	8
Eating with friends	5	7	7	8	2

Note. Rating scale ranges from 0 (none) to 10 (most).

several friends he sees multiple times throughout the week, but he had also resumed attending classes and reported that his grades were improving. Ricky and his therapist discussed Ricky's now activated behavior in contrast with his initial isolation and inactivity. Ricky said he feels proud of himself and generally feels confident that he can continue engaging in social activities despite some residual anxiety about being judged by others. Experiences afforded by Ricky's activated behavior have disconfirmed his worst fears. In addition to Ricky's verbal reports, his scores on measures of BA and social anxiety symptoms were much improved over his pretreatment scores. Ricky's therapist transitioned to the relapse prevention and termination phase of treatment.

OUTCOME INDICATORS

Several available tools may be useful for measuring outcomes associated with BA (see Manos, Kanter, & Busch, 2010 for a review). Among the most longstanding, the Pleasant Events Schedule (PES; MacPhillamy & Lewinsohn, 1982) is a self-report measure of response-contingent positive reinforcement, which is proposed to be a mechanism of depression in Lewinsohn's (1974) model. The patient reports how often a list of 320 enjoyable events occurred and the subjective pleasure experienced during these events over the last month. The average cross-product of frequency and subjective pleasure can be used to assess obtained pleasure. Psychometric studies support the test–retest reliability and discriminant validity of the PES (e.g., MacPhillamy & Lewinsohn, 1982). At the same time, the length of this measure may be unwieldy in routine clinical settings, especially in cases where a therapist seeks to track changes in BA on a session-by-session basis.

The Reward Probability Index (RPI; Carvalho et al., 2011) is another measure of response-contingent positive reinforcement, which consists of 20 Likert-scale items composing two subscales—reward probability and environmental suppressors. The RPI has good convergent validity with measures of related constructs, including activity, reinforcement, and depression (Carvalho et al., 2011). The Environmental Reward Observation Scale (EROS; Armento & Hopko, 2007) assesses subjective reinforcement over the past few months and consists of 10 items loading on a single factor with good internal consistency and

test–retest reliability. Research suggests that the EROS is moderately correlated with the PES and RPI, and that it predicts daily diary reporting of reward behaviors even after controlling for depression (Armento & Hopko, 2007; Carvalho et al., 2011). It is worth noting, however, that the RPI and EROS are measures of response-contingent positive reinforcement, rather than BA per se.

The Behavioral Activation for Depression Scale (BADS; Kanter, Mulick, Busch, Berlin, & Martell, 2007) assesses engagement in behavioral avoidance and BA and contains 25 items comprising four subscales—activation, avoidance/rumination, work/school impairment, and social impairment. A revised, shorter version of the BADS (Manos, Kanter, & Luo, 2011) consists of nine items with good psychometric properties. This shorter form was designed to improve psychometric properties of the original BADS and may be more practical for session-to-session administration in a clinical setting. Although items on the shorter form load on two subscales (activation and avoidance), it is recommended to use the total score only (Fuhr, Hautzinger, Krisch, Berking, & Ebert, 2016; Manos et al., 2011). The BADS long and short form and other outcome indicators can be used in research protocols investigating the effectiveness of BA for anxiety and related disorders and in direct patient care.

EMPIRICAL SUPPORT

Though empirical support for efforts to increase BA within the context of treatment for clinical anxiety is limited, there is abundant evidence that increasing BA in patients with depression is efficacious and effective (see Ekers et al., 2014; Mazzucchelli et al., 2009; Sturmey, 2009). Given the conceptual and functional overlap of exposure- and BA-focused treatments—as well as the practical advantages of targeting BA during treatment for clinical anxiety—examining whether capitalizing on BA to treat anxiety and related disorders is a clear next step. Whereas early studies noted improvements in anxiety secondary to depression (e.g., Hopko et al., 2004), more recent studies support targeting BA in the context of anxiety and related disorders, especially PTSD (Hershenberg et al., 2018; Jakupcak et al., 2006; Jakupcak, Wagner, Paulson, Varra, & McFall, 2010). Jakupcak and colleagues (2006) found that veterans experienced moderate reduction in therapist-rated PTSD symptoms (Hedge's $g = .58$) after 16 sessions of BA-based treatment. Other researchers have synthesized behavioral principles by combining exposure and BA-promoting techniques (Gros, 2014; Gros, Price, Strachan, et al., 2012; Strachan et al., 2012).

Preliminary findings support the use of BA-promoting interventions in the amelioration of clinical anxiety, either as a standalone treatment or in combination with exposure-based treatments. Nevertheless, evidence for the efficacy of targeting BA in patients with clinical anxiety is mainly derived from case studies and preliminary trials and should be considered preliminary at this point. Table 17.4 provides a summary of studies that examined the effects of BA-focused treatments on anxiety and related conditions.

TABLE 17.4. Studies of Behavioral Activation-Focused Interventions to Treat Anxiety and Related Disorders

Study	Sample	Protocol	Outcome
Hershenberg et al., 2018	Veterans	12-week group BA treatment	Significant reduction in PTSD symptoms (PCL) with 65% improved or recovered.
Acierno et al., 2016	Veterans	BA–TE	Significant reduction in PTSD symptoms (PCL) delivered in person or through home-based telehealth up to 12 months posttreatment.
Strachan et al., 2012	Veterans with PTSD and MDD	BA–TE	Significant reduction in PTSD symptoms (PCL) and anxiety symptoms (BAI).
Wagner et al., 2007	Survivors of traumatic injury	4–6 sessions of BA treatment	Significant reduction in PTSD symptoms (PCL), also better than treatment as usual.
Jakupcak et al., 2010	Veterans	5–8 sessions of BA treatment	Significant reduction in PTSD symptoms (PCL and CAPS).
Nixon and Nearmy, 2011	Community members with PTSD and MDD	12–16 sessions of BA treatment combined with CBT for PTSD	Significant reduction in symptoms (CAPS, DASS, PDS, & PTCI) maintained at 3-month follow-up; 60% of subjects no longer met criteria for PTSD.
Chen, Liu, Rapee, and Pillay, 2013	Community members self-referred for worry	8 sessions of group BAW	55% of BA group no longer met criteria for GAD compared with 0% in the waitlist control group; significant reduction in worry (PSWQ) for BA group.
Hopko et al., 2016	Women with breast cancer and MDD	BATD	Clinically significant reduction in anxiety (BAI) for 41% of patients.
Turner and Leach, 2010	Middle-age adults with anxiety disorders	12 sessions of BATA	Clinically significant reduction in anxiety (BAI, DARS, DASS) maintained through a 3-month posttreatment follow-up in each patient.
Chu et al., 2009	7th and 8th graders with affective disorder	10 sessions of GBAT	Clinically significant reduction in principal diagnosis severity (ADIS-IV-C) for 3 of 4 treatment completers.
Chu et al., 2016	Adolescents with unipolar depression disorder or anxiety disorder	10 weekly sessions of GBAT	GBAT showed superior posttreatment outcomes compared with waitlist control group in overall impairment and in secondary diagnosis remission rates and impairment.

Note. Effects on depression and other nonanxiety outcomes are not reported in this table.
BA = behavioral activation; PTSD = posttraumatic stress disorder; PCL = PTSD checklist; BA–TE = behavioral activation and therapeutic exposure; MDD = major depressive disorder; BAI = Beck anxiety inventory; CAPS = Clinician-Administered PTSD scale; CBT = cognitive behavior therapy; DASS = Depression Anxiety Stress Scales; PDS = Posttraumatic Stress Diagnostic Scale; PTCI = Posttraumatic Cognitions Inventory; BAW = behavioral activation for worry; GAD = generalized anxiety disorder; PSWQ = Penn State Worry Questionnaire; BATD = brief behavioral activation treatment for depression; BATA = behavioral activation treatment for anxiety; DARS = Daily Anxiety Rating Scale; GBAT = group behavioral activation therapy; ADIS-IV-C = Anxiety Disorders Interview Schedule for DSM–IV—child interview.

CHALLENGES AND TROUBLE-SHOOTING

There are a number of potential challenges to targeting BA when working with patients with anxiety disorders to improve the likelihood of treatment success. Possible solutions (or prevention strategies) for each of these challenges are discussed next.

Therapist Challenges

From a therapist's perspective, incorporating therapeutic procedures that promote BA in the context of treatment for anxiety disorders presents a few challenges. Most notably, evidence-based therapists tend to consider BA relevant only for depression, without recognizing the overlap between BA- and exposure-based therapies because of the lack of coverage of BA in nondepression treatment manuals. Without a therapist's buy-in and understanding of these overlapping approaches, it is unlikely that the patient will successfully increase their application of BA principles. One approach is to conceptualize BA-related activities and exposure practices under a transdiagnostic treatment perspective. As noted previously, BA-focused treatments seek to address avoidance of pleasurable activities that serves to maintain symptoms of depression and/or anxiety. Targeting BA can be considered a transdiagnostic practice to address transdiagnostic symptoms. As an example, transdiagnostic behavior therapy (TBT) conceptualizes avoidance as the key transdiagnostic symptom for the depression and anxiety disorders and advocates for the use of transdiagnostic exposure practices (Gros, 2014). TBT incorporates the principle of BA by framing activity scheduling as a type of exposure (i.e., positive emotions exposure) that can be delivered in conjunction with typical in vivo exposure. Research on the dissemination of TBT suggests that this approach is easily understood and assimilated by therapists (Gros, Szafranski, & Shead, 2017).

Patient Challenges

Despite the potential for increases in BA to facilitate treatment gains for clinical anxiety, strong or long-standing avoidance of anxiety-provoking situations may interfere with a patient's ability to comply with the targeted behavioral goal or ability to enjoy the behavior. This is exacerbated by the reality that most BA-relevant scheduled activities are not traditionally completed in-session (as in the case of in-session exposure practice). For example, a patient with panic disorder may be too afraid of experiencing a panic attack (and the heart attack anticipated to follow) to complete activities that induce physiological arousal (e.g., jogging with a friend). In these cases, the therapist should consider having the patient complete situational exposure practices by themselves in-session before approaching such activities with friends outside of the session. Although standard depression treatment protocols centered on BA do not include psychoeducation for anxiety or in-session behavioral practices, doing so is common in transdiagnostic treatment programs (e.g., Acierno et al., 2016; Gros, 2014).

A patient also may use safety behaviors in an attempt to mitigate anxiety during feared, positive activities. For example, a patient with PTSD may be unwilling to go out in public unless carrying a firearm. As discussed in Chapter 2, this handbook, safety behaviors tend to disrupt effective exposure to feared situations (Helbig-Lang & Petermann, 2010). The therapist should work with the patient to assess for engagement in safety behaviors that may undermine the potential long-term benefit of BA-promoting activities. Consistent with this, the patient may rely on subtle avoidance behaviors to manage anxiety while completing scheduled activities. For example, to check an activity off the list (e.g., having meal with family in public location), a patient with PTSD may only go if he or she can sit with his back to the wall. Although the patient may have made progress that week by showing up at the restaurant despite an urge to avoid it, the therapist should reinforce this progress in BA while simultaneously assessing for the presence of anxiety-reducing behaviors that undermine long-term success.

Finally, symptoms and disorders that are frequently comorbid with certain presentations of clinical anxiety may complicate the therapist's attempts to capitalize on the mechanism of BA during anxiety treatment. For example, a patient with chronic pain symptoms or limited mobility may struggle to identify fulfilling positive activities (e.g., focusing only on what used to bring him or her joy with inflexible ideas about in what he or she can still engage), or the patient may overextend himself or herself when trying to increase BA (e.g., exacerbating pain or headaches). Similar difficulties are found in patients with physical handicaps (e.g., blindness). The therapist and the patient must be flexible in selecting potentially rewarding activities and setting their intensity and duration (e.g., pacing for chronic pain). It is recommended to return to a patient's values in the flexible selection of these activities.

Resolving Therapy-Interfering Behaviors

As in any treatment, the patient may engage in behaviors that derail progress. Such behaviors may obstruct increases in BA if the patient expects sessions to be a chance to vent frustrations or if he or she refuses to complete between-session homework. One way to deal with this issue is to discuss patient expectations about treatment in the initial session, checking with the patient to ensure that the rationale and treatment plan underlying BA is understood. Patient noncompletion of homework may also represent avoidance of distressing emotions and/or situations. Guiding the patient to recognize this avoidance redirects the patient toward the rationale and plan for treatment. The therapist can also encourage activity completion by praising completed activities. Rather than focus on extrinsic reinforcement (e.g., giving praise for behavior), the therapist might celebrate success by helping the patient to reflect on what the goal completion means to the patient and how that accomplishment might help the patient continue to be successful in choosing healthy behaviors and improving mood. The therapist is cautioned against using aversive control (e.g., chastising the patient), as doing so can

generalize to participation in treatment, which risks premature treatment discontinuation.

CONCLUSION

The mechanism of increasing contact with potential reinforcers in the environment (e.g., BA) is most closely associated with behavioral treatments for depression. This chapter suggested that capitalizing on BA may also serve to facilitate treatment for clinical anxiety. Moreover, there is substantial conceptual and practical overlap between BA- and exposure-based therapies. Growing evidence supports the utility of increasing BA in the context of anxiety treatment, such that new transdiagnostic treatments (e.g., Gros, 2014) incorporate BA-focused activity scheduling into exposure therapy. Future work that continues to incorporate the principle of BA into cognitive behavior treatments for clinical anxiety is necessary and expected to have considerable benefit to therapists and patients alike.

REFERENCES

Abramowitz, J. S., Franklin, M. E., Street, G. P., Kozak, M. J., & Foa, E. B. (2000). Effects of comorbid depression on response to treatment for obsessive-compulsive disorder. *Behavior Therapy*, *31*, 517–528. http://dx.doi.org/10.1016/S0005-7894(00)80028-3

Acierno, R., Gros, D. F., Ruggiero, K. J., Hernandez-Tejada, B. M. A., Knapp, R. G., Lejuez, C. W., . . . Tuerk, P. W. (2016). Behavioral activation and therapeutic exposure for posttraumatic stress disorder: A noninferiority trial of treatment delivered in person versus home-based telehealth. *Depression and Anxiety*, *33*, 415–423. http://dx.doi.org/10.1002/da.22476

Armento, M. E., & Hopko, D. R. (2007). The environmental reward observation scale (EROS): Development, validity, and reliability. *Behavior Therapy*, *38*, 107–119. http://dx.doi.org/10.1016/j.beth.2006.05.003

Bunnell, B. E., & Gros, D. F. (2017). Transdiagnostic behavior therapy (TBT) for generalized anxiety disorder. *International Journal of Case Studies*, *6*, 1–8.

Carvalho, J. P., Gawrysiak, M. J., Hellmuth, J. C., McNulty, J. K., Magidson, J. F., Lejuez, C. W., & Hopko, D. R. (2011). The reward probability index: Design and validation of a scale measuring access to environmental reward. *Behavior Therapy*, *42*, 249–262. http://dx.doi.org/10.1016/j.beth.2010.05.004

Chen, J., Liu, X., Rapee, R. M., & Pillay, P. (2013). Behavioural activation: A pilot trial of transdiagnostic treatment for excessive worry. *Behaviour Research and Therapy*, *51*, 533–539. http://dx.doi.org/10.1016/j.brat.2013.05.010

Chu, B. C., Colognori, D., Weissman, A. S., & Bannon, K. (2009). An initial description and pilot of group behavioral activation therapy for anxious and depressed youth. *Cognitive and Behavioral Practice*, *16*, 408–419. http://dx.doi.org/10.1016/j.cbpra.2009.04.003

Chu, B. C., Crocco, S. T., Esseling, P., Areizaga, M. J., Lindner, A. M., & Skriner, L. C. (2016). Transdiagnostic group behavioral activation and exposure therapy for youth anxiety and depression: Initial randomized controlled trial. *Behaviour Research and Therapy*, *76*, 65–75. http://dx.doi.org/10.1016/j.brat.2015.11.005

Craske, M. G., Treanor, M., Conway, C. C., Zbozinek, T., & Vervliet, B. (2014). Maximizing exposure therapy: An inhibitory learning approach. *Behaviour Research and Therapy*, *58*, 10–23. http://dx.doi.org/10.1016/j.brat.2014.04.006

Crino, R. D., & Andrews, G. (1996). Obsessive-compulsive disorder and Axis I comorbidity. *Journal of Anxiety Disorders*, *10*, 37–46. http://dx.doi.org/10.1016/0887-6185(95)00033-X

Dimidjian, S., Hollon, S. D., Dobson, K. S., Schmaling, K. B., Kohlenberg, R. J., Addis, M. E., . . . Jacobson, N. S. (2006). Randomized trial of behavioral activation, cognitive therapy, and antidepressant medication in the acute treatment of adults with major depression. *Journal of Consulting and Clinical Psychology*, *74*, 658–670. http://dx.doi.org/10.1037/0022-006X.74.4.658

Ekers, D., Webster, L., Van Straten, A., Cuijpers, P., Richards, D., & Gilbody, S. (2014). Behavioural activation for depression; an update of meta-analysis of effectiveness and sub group analysis. *PLoS One*, *9*, e100100. http://dx.doi.org/10.1371/journal.pone.0100100

Foa, E. B., Hembree, E. A., & Rothbaum, B. O. (2007). *Prolonged exposure therapy for PTSD: Emotional processing of traumatic experiences, therapist guide*. New York, NY: Oxford University Press. http://dx.doi.org/10.1093/med:psych/9780195308501.001.0001

Fuhr, K., Hautzinger, M., Krisch, K., Berking, M., & Ebert, D. D. (2016). Validation of the behavioral activation for depression scale (BADS)–psychometric properties of the long and short form. *Comprehensive Psychiatry*, *66*, 209–218. http://dx.doi.org/10.1016/j.comppsych.2016.02.004

Gortner, E. T., Gollan, J. K., Dobson, K. S., & Jacobson, N. S. (1998). Cognitive-behavioral treatment for depression: Relapse prevention. *Journal of Consulting and Clinical Psychology*, *66*, 377–384. http://dx.doi.org/10.1037/0022-006X.66.2.377

Gros, D. F. (2014). Development and initial evaluation of transdiagnostic behavior therapy (TBT) for veterans with affective disorders. *Psychiatry Research*, *220*, 275–282. http://dx.doi.org/10.1016/j.psychres.2014.08.018

Gros, D. F., & Antony, M. M. (2006). The assessment and treatment of specific phobias: A review. *Current Psychiatry Reports*, *8*, 298–303. http://dx.doi.org/10.1007/s11920-006-0066-3

Gros, D. F., McCabe, R. E., & Antony, M. M. (2013). Using a hybrid model to investigate the comorbidity and symptom overlap between social phobia and the other anxiety disorders and unipolar mood disorders. *Psychiatry Research*, *210*, 188–192. http://dx.doi.org/10.1016/j.psychres.2013.05.005

Gros, D. F., Price, M., Magruder, K. M., & Frueh, B. C. (2012). Symptom overlap in posttraumatic stress disorder and major depression. *Psychiatry Research*, *196*, 267–270. http://dx.doi.org/10.1016/j.psychres.2011.10.022

Gros, D. F., Price, M., Strachan, M., Yuen, E. K., Milanak, M. E., & Acierno, R. (2012). Behavioral activation and therapeutic exposure: An investigation of relative symptom changes in PTSD and depression during the course of integrated behavioral activation, situational exposure, and imaginal exposure techniques. *Behavior Modification*, *36*, 580–599. http://dx.doi.org/10.1177/0145445512448097

Gros, D. F., Szafranski, D. D., & Shead, S. D. (2017). A real-world dissemination and implementation of transdiagnostic behavior therapy (TBT) for veterans with affective disorders. *Journal of Anxiety Disorders*, *46*, 72–77. http://dx.doi.org/10.1016/j.janxdis.2016.04.010

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2011). *Acceptance and commitment therapy, second edition: The process and practice of mindful change*. New York, NY: Guilford Press.

Helbig-Lang, S., & Petermann, F. (2010). Tolerate or eliminate? A systematic review on the effects of safety behavior across anxiety disorders. *Clinical Psychology: Science and Practice*, *17*, 218–233. http://dx.doi.org/10.1111/j.1468-2850.2010.01213.x

Hershenberg, R., Smith, R. V., Goodson, J. T., & Thase, M. E. (2018). Activating veterans toward sources of reward: A pilot report on development, feasibility, and clinical outcomes of a 12-week behavioral activation group treatment. *Cognitive and Behavioral Practice, 25,* 57–69. http://dx.doi.org/10.1016/j.cbpra.2017.04.001

Hopko, D. R., Armento, M. E., Robertson, S. M., Ryba, M. M., Carvalho, J. P., Colman, L. K., . . . Lejuez, C. W. (2011). Brief behavioral activation and problem-solving therapy for depressed breast cancer patients: Randomized trial. *Journal of Consulting and Clinical Psychology*, *79*, 834–849. http://dx.doi.org/10.1037/a0025450

Hopko, D. R., Lejuez, C., & Hopko, S. D. (2004). Behavioral activation as an intervention for coexistent depressive and anxiety symptoms. *Clinical Case Studies*, *3*, 37–48. http://dx.doi.org/10.1177/1534650103258969

Hopko, D. R., Lejuez, C. W., Ryba, M. M., Shorter, R. L., & Bell, J. L. (2016). Support for the efficacy of behavioural activation in treating anxiety in breast cancer patients. *Clinical Psychologist*, *20*, 17–26. http://dx.doi.org/10.1111/cp.12083

Jacobson, N. S., Dobson, K. S., Truax, P. A., Addis, M. E., Koerner, K., Gollan, J. K., . . . Prince, S. E. (1996). A component analysis of cognitive-behavioral treatment for depression. *Journal of Consulting and Clinical Psychology*, *64*, 295–304. http://dx.doi.org/10.1037/0022-006X.64.2.295

Jakupcak, M., Roberts, L. J., Martell, C., Mulick, P., Michael, S., Reed, R., . . . McFall, M. (2006). A pilot study of behavioral activation for veterans with posttraumatic stress disorder. *Journal of Traumatic Stress*, *19*, 387–391. http://dx.doi.org/10.1002/jts.20125

Jakupcak, M., Wagner, A., Paulson, A., Varra, A., & McFall, M. (2010). Behavioral activation as a primary care-based treatment for PTSD and depression among returning veterans. *Journal of Traumatic Stress*, *23*, 491–495. http://dx.doi.org/10.1002/jts.20543

Kanter, J. W., Manos, R. C., Bowe, W. M., Baruch, D. E., Busch, A. M., & Rusch, L. C. (2010). What is behavioral activation? A review of the empirical literature. *Clinical Psychology Review*, *30*, 608–620. http://dx.doi.org/10.1016/j.cpr.2010.04.001

Kanter, J. W., Mulick, P. S., Busch, A. M., Berlin, K. S., & Martell, C. R. (2007). The behavioral activation for depression scale (BADS): Psychometric properties and factor structure. *Journal of Psychopathology and Behavioral Assessment*, *29*, 191–202. http://dx.doi.org/10.1007/s10862-006-9038-5

Lejuez, C. W., Hopko, D. R., Acierno, R., Daughters, S. B., & Pagoto, S. L. (2011). Ten-year revision of the brief behavioral activation treatment for depression: Revised treatment manual. *Behavior Modification*, *35*, 111–161. http://dx.doi.org/10.1177/0145445510390929

Lejuez, C. W., Hopko, D. R., & Hopko, S. D. (2001). A brief behavioral activation treatment for depression. Treatment manual. *Behavior Modification*, *25*, 255–286. http://dx.doi.org/10.1177/0145445501252005

Lewinsohn, P. M. (1974). A behavioral approach to depression. In J. C. Coyne (Ed.), *Essential papers on depression* (pp. 150–172). New York: New York University Press.

Lewinsohn, P. M., Sullivan, J. M., & Grosscup, S. J. (1980). Changing reinforcing events: An approach to the treatment of depression. *Psychotherapy: Theory, Research & Practice*, *17*, 322–334. http://dx.doi.org/10.1037/h0085929

MacPherson, L., Collado, A., Lejuez, C. W., Brown, R. A., & Tull, M. T. (2016). Behavioral activation treatment for smoking (BATS) in smokers with depressive symptomatology. *Advances in Dual Diagnosis*, *9*, 85–96. http://dx.doi.org/10.1108/ADD-02-2016-0005

MacPhillamy, D. J., & Lewinsohn, P. M. (1982). The pleasant events schedule: Studies on reliability, validity, and scale intercorrelation. *Journal of Consulting and Clinical Psychology*, *50*, 363–380. http://dx.doi.org/10.1037/0022-006X.50.3.363

Magidson, J. F., Gorka, S. M., MacPherson, L., Hopko, D. R., Blanco, C., Lejuez, C. W., & Daughters, S. B. (2011). Examining the effect of the life enhancement treatment for substance use (LETS ACT) on residential substance abuse treatment retention. *Addictive Behaviors*, *36*, 615–623. http://dx.doi.org/10.1016/j.addbeh.2011.01.016

Manos, R. C., Kanter, J. W., & Busch, A. M. (2010). A critical review of assessment strategies to measure the behavioral activation model of depression. *Clinical Psychology Review*, *30*, 547–561. http://dx.doi.org/10.1016/j.cpr.2010.03.008

Manos, R. C., Kanter, J. W., & Luo, W. (2011). The behavioral activation for depression scale-short form: Development and validation. *Behavior Therapy*, *42*, 726–739. http://dx.doi.org/10.1016/j.beth.2011.04.004

Martell, C. R., Addis, M. E., & Jacobson, N. S. (2001). *Depression in context: Strategies for guided action*. New York, NY: W. W. Norton.

Mazzucchelli, T., Kane, R., & Rees, C. (2009). Behavioral activation treatments for depression in adults: A meta-analysis and review. *Clinical Psychology: Science and Practice*, *16*, 383–411. http://dx.doi.org/10.1111/j.1468-2850.2009.01178.x

Moffitt, T. E., Harrington, H., Caspi, A., Kim-Cohen, J., Goldberg, D., Gregory, A. M., & Poulton, R. (2007). Depression and generalized anxiety disorder: Cumulative and sequential comorbidity in a birth cohort followed prospectively to age 32 years. *Archives of General Psychiatry*, *64*, 651–660. http://dx.doi.org/10.1001/archpsyc.64.6.651

Nixon, R. D., & Nearmy, D. M. (2011). Treatment of comorbid posttraumatic stress disorder and major depressive disorder: A pilot study. *Journal of Traumatic Stress*, *24*, 451–455. http://dx.doi.org/10.1002/jts.20654

Ramnerö, J., & Törneke, N. (2008). *ABCs of human behavior: Behavioral principles for the practicing clinician*. Reno, NV: Context Press.

Resick, P. A., & Schnicke, M. k. (1993). *Cognitive processing therapy for rape victims: A treatment manual*. Newbury Park, CA: Sage.

Strachan, M., Gros, D. F., Ruggiero, K. J., Lejuez, C. W., & Acierno, R. (2012). An integrated approach to delivering exposure-based treatment for symptoms of PTSD and depression in OIF/OEF veterans: Preliminary findings. *Behavior Therapy*, *43*, 560–569. http://dx.doi.org/10.1016/j.beth.2011.03.003

Sturmey, P. (2009). Behavioral activation is an evidence-based treatment for depression. *Behavior Modification, 33*, 818–829. http://dx.doi.org/10.1177/0145445509350094

Turner, J. S., & Leach, D. J. (2010). Experimental evaluation of behavioral activation treatment of anxiety (BATA) in three older adults. *International Journal of Behavioral Consultation and Therapy, 6*, 373. http://dx.doi.org/10.1037/h0100917

Wagner, A. W., Zatzick, D. F., Ghesquiere, A., & Jurkovich, G. J. (2007). Behavioral activation as an early intervention for posttraumatic stress disorder and depression among physically injured trauma survivors. *Cognitive and Behavioral Practice*, *14*, 341–349. http://dx.doi.org/10.1016/j.cbpra.2006.05.002

Wolpe, J. (1969). *The practice of behavior therapy*. New York, NY: Pergamon Press.

18

Mindfulness and Acceptance

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Mindfulness and acceptance are distinct but related constructs. *Mindfulness* originated with the teachings of the Buddha, who lived and taught around 2,600 years ago in what is now India. Pali was the language of the Buddha, and the word mindfulness is an English interpretation of the Pali word *sati.* Sati, loosely translated, means "remembering." As described by the Buddhist scholar Anālayo (2003), "it is due to the presence of sati that one is able to remember what is otherwise only too easily forgotten: the present moment" (pp. 47–48). Therefore, mindfulness refers to the act of remembering an experience as it occurs in the present moment and may be aptly translated as "present moment awareness" (Anālayo, 2003). As described by the Buddha, at the core of Buddhist meditation practice, "right mindfulness" or *sammā sati* is one of eight factors on the path leading to the cessation of suffering. In its original Buddhist context, mindfulness is one of a number of interrelated qualities that, when cultivated, has the potential to lead one out of suffering. It is with this function in mind that mindfulness was borrowed by Western psychological science.

Mindfulness, as adopted by Western psychology, has been difficult to operationalize. Generally, the construct is assumed to reflect its original Buddhist meaning, but it is defined differently by researchers (Grossman & Van Dam, 2011). An influential psychological definition of mindfulness comes from Jon Kabat-Zinn (1994), who called it "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (p. 4). As a verb, "paying

attention" highlights mindfulness as an activity rather than as the stable trait that is sometimes implied by common self-report measures of mindfulness (Grossman & Van Dam, 2011). The cultivation of mindfulness requires diligence and effort; as such, it is a practice. In addition, because mindfulness is a type of awareness, it can be practiced at any moment in any situation. This leads to the second part of Kabat-Zinn's definition (1994): "on purpose." Mindfulness is not haphazard attention; it is purposeful and sustained attention, taking as its object whatever is occurring in the present moment (the third part of his definition). As for the final part of the definition, nonjudgment was not originally included in the meaning of sati. However, a mindful state does engender nonjudgment through sustained attention on the direct knowing of experience without added verbal material (e.g., internal commentary, which is often evaluative). Through mindfulness, one is able to notice judgment as it arises and realize that such verbal proliferations are not a part of the direct experience, so judgment is simply dropped.

Acceptance is a construct commonly associated with mindfulness, but it was not a term used by the Buddha (Bhikkhu, 2008). In fact, acceptance tends to be the result of mindfulness rather than an aspect of its definition. As a purely psychological construct, acceptance refers to an openness to internal experiences (e.g., thoughts, emotions, physical sensations) and a willingness to actively embrace those experiences, be they perceived as pleasant or unpleasant. Acceptance is often contrasted with experiential avoidance (see Chapter 7), which is an unwillingness to stay in contact with certain difficult psychological experiences and deliberate attempts to avoid, escape, or somehow alter the form of these experiences, even when doing so has a harmful effect (Hayes, Strosahl, & Wilson, 2011).

When one is mindful of internal experiences, without adding additional verbal material (e.g., judgment), an accepting stance naturally arises. Furthermore, to accept internal experiences, one must remain in contact with them as they unfold in the moment; in other words, one must be mindful. Through continued practice, the range of experiences one can accept expands and, therefore, so does the range of objects of which to be mindful. In these ways, mindfulness and acceptance complement and strengthen each other.

IMPLEMENTATION

Overview of Mindfulness- and Acceptance-Based Therapies

Mindfulness and acceptance have been integrated into various psychological interventions, including among others: acceptance and commitment therapy (ACT; S. C. Hayes et al., 2011), acceptance-based behavior therapy (Hayes-Skelton, Roemer, & Orsillo, 2013; Roemer, Orsillo, & Salters-Pedneault, 2008), dialectical behavior therapy (DBT; Linehan, 2014), mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990), and mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2013). The following description

of implementation is based on an ACT approach. Details on the implementation of other mindfulness- and acceptance-based interventions may vary but underlying processes of change likely overlap across therapies.

A crucial element of a mindfulness and acceptance approach is clarifying treatment goals at the start of therapy. From this perspective, the goal of treatment is to help patients live a life they find meaningful. Because individuals wish for different things in life, the target outcomes will vary. Patients may initially say that their goal is to reduce internal or external symptoms, which could entail decreasing obsessions, worries, or anxiety. However, if the clinician digs a little deeper, it is likely that reducing internal symptoms is simply a means to a more meaningful life.

A second critical element is that, from a mindfulness and acceptance approach, one learns to let go of evaluating inner experiences as good or bad. Thoughts, feelings, and bodily sensations occur throughout the day. Some are minor or even imperceptible, while others, such as obsessions and worries, are substantial and salient. Taking a mindful and accepting stance toward inner experiences makes it easier to choose how to react when an inner experience is occurring. The aim is to alter the function or effect of the inner experience in a contextually sensitive manner. Thus, inner experiences cannot be categorically defined; they must be functionally defined. For example, it is usually useful to act on the feeling of love or caring for one's family, but there are also times when it is more functional to "ignore" that inner experience and carry on with the task in which one is engaged. A primary objective in the treatment of anxiety is to alter the relationship with inner experiences from one in which certain experiences *demand* action to one in which they are only *suggestions* for action. It is helpful, or at least therapeutically consistent, to be explicit about these two points from the onset of therapy.

The following sections outline the use of mindfulness and acceptance for obsessive-compulsive disorder (OCD; see Eifert & Forsyth, 2005; Twohig, 2009; Twohig et al., 2010) and generalized anxiety disorder (GAD; see Roemer & Orsillo, 2005; Roemer et al., 2008). We then discuss the common themes and overarching ideas in treatment and how they can be applied to other clinical manifestations of anxiety. Table 18.1 provides examples of therapeutic exercises and metaphors that might be used to capitalize on mindfulness and acceptance as processes of change.

Obsessive-Compulsive Disorder

Mindfulness and Acceptance in the Treatment of Obsessive-Compulsive Disorder. OCD is characterized by the presence of (a) intrusive and unwanted thoughts, images, or urges (obsessions) and/or (b) repetitive behaviors (overt or mental) that are performed to reduce anxiety or distress (compulsions; American Psychiatric Association, 2013). Traditional exposure with response prevention (ERP) continues to be the key ingredient in the treatment of OCD. Many researchers have worked to add logically or empirically backed techniques to bolster the effectiveness or acceptability of ERP, but nothing thus far, including mindfulness and acceptance procedures, has increased the effectiveness of

TABLE 18.1. Examples of Therapy Exercises and Metaphors Targeting Different Mindfulness and Acceptance Processes

Process	Exercise/metaphor
Effectiveness of controlling thoughts/feelings	Polygraph metaphor
Acceptance	Obsessions/anxiety as a bully metaphor
	Obsessions/anxiety as a child in a grocery store who is whining for candy metaphor
	Carry a piece of paper with obsession/worry written on it exercise
	Two games metaphor
Defusion	Mind as an announcer from a sporting event or pop-ups on a computer metaphor
	Chessboard metaphor
	Passengers on the bus metaphor
	Mind as a GPS metaphor
	Notepad physical metaphor
	Word repetition exercise
	Leaves on a stream mindfulness exercise
Mindfulness	Concentration-based meditation exercise
	Flexible attention mindfulness exercise

ERP (Olatunji, Davis, Powers, & Smits, 2013; Öst, Havnen, Hansen, & Kvale, 2015; Tolin, 2009; Twohig et al., 2018). Nonetheless, it is worthwhile to be familiar with these procedures for situations in which ERP has been ineffective, patients refuse to complete exposures, or the use of mindfulness and acceptance is indicated based on elements of the clinical presentation and evidence-based practice in psychology (American Psychological Association, Presidential Task Force on Evidence-Based Practice, 2006).

Allowing Obsessions to Be There: Acceptance. It is often helpful to start with a discussion of how well attempts to control obsessions have worked in the short term (minutes) and long term (days) and whether attempts to regulate obsessions have improved life or made it harder—in terms of (a) the obsessions being more central and (b) time spent controlling the obsessions. The answer to this question is known before it is asked, but it is helpful for patients to work through it themselves. Control strategies (e.g., compulsions, avoidance, reassurance) can lessen obsessions and anxiety briefly, but there is nothing patients can do to stop obsessions for good. Moreover, the more patients fight against obsessions, the more central obsessions become in their lives; life then revolves around emotion regulation rather than increasing meaningful actions.

Acceptance of obsessions is taught as an alternative to control. Acceptance is *not* liking or believing the content of obsessions; it is allowing them to exist within the person as one might allow an annoying coworker to work in the

same building. Acceptance is often taught through examples, including "dealing with obsessions is similar to how you might deal with a bully" or "think of your obsessions like a child in a grocery store who is whining for candy." Patients are also asked to write an obsession on a piece of paper and carry it in their pocket throughout the week as an example of being willing to take it along.

Another metaphor clinicians could use is the two-games metaphor. The point of the metaphor is to have patients see that they need to step away from attempts to regulate their obsessions in order to work on the important things in life. The following script provides an example of how clinicians could deliver the metaphor:

CLINICIAN: It's like there are two games going on right now. In the first game, the aim is to successfully control your obsessions. Winning means defeating your obsessions and keeping them away.

PATIENT: Yeah, that feels about right.

CLINICIAN: How often do you win that game?

PATIENT: Well, I can probably win 10% of the time.

CLINICIAN: And how long is it before you find yourself getting back into the game?

PATIENT: Not long. I feel like I have to be constantly playing to even have a chance of winning. It's exhausting.

CLINICIAN: Sounds like it. What if there was a second game in the court next to you? In this game, the aim is to live your life the way you want. You win by doing things you care about. But the catch is you can only play one game at a time.

PATIENT: Hmm, I've never thought about it that way, but it makes sense: the more I try to avoid my obsessions, the less I actually do the things I want to do.

CLINICIAN: Which game seems more worth playing to you at this moment?

Seeing Obsessions for What They Are: Mindfulness and Defusion. Practicing defusion or being mindful facilitates acceptance by helping patients see obsessions for what they are—thoughts, feelings, or bodily sensations. As evidenced in research on topics such as thought action fusion (Shafran, Thordarson, & Rachman, 1996), patients do not experience obsessions as mere thoughts; obsessions are experienced as real, meaningful, and having the power to affect events in the world.

Exercises such as treating the mind as an announcer from a sporting event, or pop-ups on a computer, illustrate that we do not get to choose what occurs in our heads. Similarly, watching thoughts in a formal meditation or while being mindful during an activity (e.g., brushing teeth, driving) teach the

discrimination between seeing a thought as a thought and buying into a thought and experiencing it as reality. Being able to notice an obsession dispassionately gives patients the space to decide how to react to it. Another useful exercise involves likening patients' struggle with obsessions to a game of chess. There are pieces on each side—one side represents obsessions and the other represents the ways patients try to control the obsessions. Although patients often root for one side over another, it can be useful for patients to think of themselves as the board on which the game is played. The board does not care who wins the game; the board just supports the game. An actual board game can be used to illustrate this idea. Patients can also think of themselves as a driver of a bus, with all the obsessions as passengers on the bus. In this exercise, patients are asked to describe what each obsession looks like. They can be scary or demonic; they may even be someone supportive who is pleading for a certain safe action. These passengers try to tell the driver where to go, but only the driver gets to drive the bus and has the power to choose where it goes. Patients can practice letting the passengers talk—or even yell—without responding to them and heading in a valued direction. An example of how this discussion might go follows:

CLINICIAN: We can think of it like you're driving a bus full of passengers. The passengers are always yelling at you and telling you what to do: "Go left!" "Make a U-turn here!" As the driver, you have your own agenda, places you want to visit and a direction that matters to you, but listening to your passengers tends to get in the way of that.

PATIENT: So true.

CLINICIAN: Who is the loudest passenger on your bus?

PATIENT: Definitely the "you are going to get sick and die" passenger.

CLINICIAN: What does this passenger look like?

PATIENT: Hmm, he kind of is dressed like a doctor with a stethoscope and white coat. He's middle-aged and is balding a little. He's probably of average height. He has an authoritative voice though—as if he knows what he's talking about.
[The clinician can elicit other examples of passengers to make sure the patient is experientially engaged with the metaphor.]

CLINICIAN: What do you do when the doctor tells you to go left?

PATIENT: I go left.

CLINICIAN: How does that line up with your values?

PATIENT: It doesn't, but at least the doctor leaves me alone.

CLINICIAN: Yeah, so you've kind of made a deal with the doctor: "Fine, I'll do what you tell me as long as you keep quiet."

PATIENT: Exactly.

CLINICIAN: What's that like for you?

PATIENT: Not fun. It's like I've lost control of my own bus!

CLINICIAN: It sure sounds like it. How could you get control over where your bus goes?

PATIENT: I don't know; just drive it wherever I want.

CLINICIAN: What would that look like for you?

PATIENT: Well, the passengers are going to be mad and yell even louder; but I'm the driver, so I have the power to pick where we go.

CLINICIAN: What if they get really upset and start coming to the front of the bus? Would they have the power to control your bus then?

PATIENT: I don't think so. I mean, I'm still the one with my hands on the steering wheel.

CLINICIAN: What would it be like to keep practicing doing exactly that: choosing where your bus goes regardless of what your passengers do?

PATIENT: I'd probably get my life back, honestly.

Values and Behavior Change. As suggested in a meta-analysis (Levin, Hildebrandt, Lillis, & Hayes, 2012), teaching mindfulness techniques results in less behavior change than highlighting that mindfulness may be used to support behavior change. In other words, it is critical to teach mindfulness with a purpose when using it as a psychological intervention. The purpose in this treatment is acting in line with *values*. To clarify values, clinicians have a discussion with patients about the areas of life that are important to them and into which they want to put time and effort. Career, education, family, and spirituality are examples of valued domains. Honesty, loyalty, and kindness are examples of ways of being that are also considered values. Patients define how and which areas or ways of being are meaningful to them given their beliefs, culture, upbringing, and lived experiences. Becoming aware of one's values can foster increased action in those areas. The most useful aspect of discussing values in the treatment of OCD is to help patients look at behavior more functionally. Clinicians can ask their patients, "Was that action in the service of your values or was it to lessen an obsession?" Over the course of treatment, patients learn to choose actions that are in the service of their values rather than in service of their emotion regulation.

Finally, clinicians can use behavioral commitments to establish patterns of action in line with values; these commitments involve practicing acceptance, mindfulness, and defusion. These can be integrated into traditional ERP procedures (Twohig, Abramowitz, et al., 2015). Whether within or outside of the therapy session, patients are directed to connect with the value behind the

action, engage in the action, and practice mindfully observing and making room for their obsessions. If indicated, entire sessions can be devoted to exposures as would typically be done in ERP. From a mindfulness and acceptance perspective, however, the goal is improving the ability to act in values-consistent ways in the presence of the feared stimulus (e.g., obsession, anxiety).

Generalized Anxiety Disorder

Exploring the Function and Workability of Worry. GAD is defined by a pervasive pattern of worry about a range of topics and unlikely negative outcomes that is difficult to control (American Psychiatric Association, 2013). Worry can be conceptualized as a behavior, meaning that just as with any other behavior, clinicians can guide patients in clarifying the function or purpose of worry and whether it helps them to engage in meaningful, effective activities.

One of the most common, core functions of worry is experiential avoidance (Roemer & Orsillo, 2005). This can be somewhat paradoxical in that worry often induces some degree of distress; however, this distress is typically milder, more predictable, and prevents larger, unexpected increases in distress if unexpected negative events occur. In other words, worry is used to prevent greater and more unpredictable distress. Clinicians might help patients to notice the avoidant functions of worry with questions like "When do you worry?" "If you didn't worry, what would be different?" and "Some people worry as a way to get away from scarier, unexpected, or otherwise difficult thoughts and feelings. How might this apply to you?".

Once the avoidant function of worry is clarified, clinicians can help patients to explore its workability. Worry, like most avoidant behaviors, may be effective in the short term in relieving distress. However, patients generally find that worry creates more problems than it solves in the long term. In terms of treatment, it can help to break this down when exploring workability, asking patients how worry has worked to help them feel better in the short term versus the long term. Similarly, it helps to distinguish whether worry helps with *feeling* goals (i.e., the goal to feel better) versus whether worry helps with *action* goals (i.e., the goal to take more effective, meaningful actions in one's life).

Of note, patients fitting a GAD symptom profile are likely to engage in a range of other avoidant behaviors, although these may be more diffuse than a targeted anxiety disorder (e.g., avoidance of social situations within social anxiety disorder). Thus, it is important to similarly identify and explore the workability of patients' other avoidant behaviors.

A variety of exercises and metaphors can help patients to further explore the negative "side effects" of experiential avoidant behaviors such as worry. One metaphor that helps illustrate the "worry about worry" spiral that can develop is the polygraph metaphor. This metaphor describes a person who is attached to the world's most sensitive polygraph, and their only job is not to get anxious—no matter what. To help motivate the person, patients can imagine a looming threat, such as losing a large bet or sitting over a shark

tank, if they show any anxiety whatsoever. This metaphor can then be linked to patients' own experiences of trying not to be anxious at all costs, which often leads to more anxiety and other problems in life.

Another common technique is to differentiate pain versus suffering. *Pain* refers to the naturally occurring, difficult thoughts, feelings, and bodily sensations (e.g., tension in the neck, panicky sensations) that arise as people engage in the world and interact with things that are meaningful to them. For example, it makes sense to feel anxiety if there is something important at stake, but at which you could fail. *Suffering*, however, is all the added unpleasant thoughts and feelings that arise when we focus on trying to make our pain go away. This can be illustrated by eliciting an example from the patient. For example, the patient may be guided to notice how anxiety arises in relation to receiving a large bill in the mail (i.e., pain), while worrying intensely and avoiding looking at the bill might make anxiety (and likely the bill itself, due to late fees) bigger and bigger (i.e., suffering).

Ideally, by the end of this work, the patient will have learned how to identify actions (including worry) that function as experiential avoidance as well as clarified their workability. This provides the foundation for introducing mindfulness and acceptance strategies. Skipping this step can introduce the potential problem of patients using mindfulness and acceptance as just another experientially avoidant behavior (e.g., being mindful to make worry go away). To shift to a radically different way of relating to thoughts and feelings, it is important that patients first do this initial work to identify the function and workability of their coping strategies thus far.

Relating to Worry and Other Cognitions From a "Defused" Stance. The next set of skills can be introduced in various sequences. A typical sequence might next shift to exploring challenges related to how language works. This includes helping patients notice how thoughts are automatic and relatively out of our control, but can seem to have a lot of power over perceptions and actions when allowed (which we refer to as cognitive fusion). This work builds up to teaching cognitive defusion as an alternate way of responding to thoughts as "just thoughts."

There are a variety of metaphors that can help orient patients to a cognitively fused versus defused stance toward thoughts. For example, "If your mind were like a GPS (global positioning system), being fused would be like driving wherever it told you to go, even if it ended up driving you into a lake." Cognitive defusion is like acknowledging what your GPS is saying, but noticing it as just a GPS and that you can still choose where to drive. This brief metaphor helps patients to shift how they approach their thoughts—equating thoughts such as, "I have to go over all my deadlines right now," with times a GPS was clearly wrong and they chose to drive independent of what it said.

Another metaphor is to take a physical object such as a notepad and to tell the patient, "Let's say this notepad is your worry," then having the patient write down a few of their most worrisome thoughts. We then walk through a variety of ways of interacting with the thought. Cognitive fusion is illustrated

as the notepad up close to the patient's face, so that the only thing the person can see is the thought, thereby missing out on what is happening in the present. Experiential avoidance (e.g., thought suppression, distraction) would be like pushing the notepad out as far as it can go. The clinician can explore with the patient what might happen—eventually your arm gets tired and the whole time your focus (and one of your arms) is working to keep that worry away. Finally, cognitive defusion is introduced as just letting the notepad lay in the patient's lap. This means being in touch with the thought, letting it be there without fighting it. However, this frees the patient up to focus on what the patient wants to focus on in the moment, and to have the patient's hands be free to do whatever is needed. Physical metaphors like these, if they resonate with patients, can provide a quick prompting tool in future sessions—helping patients notice if the notepad is getting stuck against their face or if they are fighting hard to push it away.

In addition to orienting to the concept of defusion, having patients experientially practice relating to thoughts from a defused stance can be helpful. Experiential exercises evoke a more dramatic, contextual shift in the moment to help patients really "get" what it is like to see thoughts as just thoughts. This is sometimes targeted with brief exercises such as repeating a word over and over again until it loses its meaning and becomes just sounds, like odd noises. An example of how to deliver this exercise follows:

CLINICIAN: If you could boil down your worry to one word, what would it be?

PATIENT: I think ultimately it comes down to being a failure. That's what drives a lot of my worry.

CLINICIAN: I notice when you say "failure," some emotion came up for you. What just showed up?

PATIENT: I guess I'm just thinking about how I might be disappointing people I care about and how crappy that feels.

CLINICIAN: Seems like that word has some power over you.

PATIENT: Yeah, that's what it feels like.

CLINICIAN: All right, would you be willing to do a silly exercise with me?

PATIENT: Um, sure.

CLINICIAN: OK, we are going to say "failure" as many times as we can in the next 30 seconds. I'll keep an eye on the clock as we do it. I need you to pay attention to what happens to that word as we repeat it. Right now, it has a lot of power. I'm curious if that stays true during this exercise.

PATIENT: Seems odd, but OK.

CLINICIAN: Are you ready?

PATIENT: Sure, I guess.

CLINICIAN: Let's start now.
                [Clinician and patient repeat "failure" as many times as they can in 30 seconds. Clinician can prompt patient to "go faster" if they notice the patient slowing down repetition.]

CLINICIAN: All right, that's 30 seconds. What did you notice about "failure" as you did that exercise?

PATIENT: It became weird!

CLINICIAN: What do you mean?

PATIENT: Like, it just sounds weird. I was so focused on saying "failure" as quickly as possible and wasn't thinking about the meaning. I noticed it got a bit hard to say.

CLINICIAN: What did you notice about the effect of the word "failure" on you?

PATIENT: It didn't really have an effect. At least not like before we did the exercise.

CLINICIAN: How interesting. What do you make of that?

PATIENT: I don't know. It was kind of cool, I guess. It's such a hard thing for me to say or think about so that's a new experience for me.

CLINICIAN: And the whole time, even though we didn't do anything to change the word "failure," the power it had over you changed.

PATIENT: Sort of. Yeah, I didn't have that same feeling of sadness when we were repeating it.

Somewhat longer "eyes closed" experiential exercises are also often used such as the "leaves on a stream" meditation where patients imagine a stream and practice placing each thought they have on a passing leaf. Exercises like these help patients to experience what it is to simply notice thoughts as thoughts without fighting them or being fused with (controlled by) them.

Being Mindful of the Present Rather Than the Past or Future. Worry focuses on imagined, feared futures, which means it naturally pulls patients away from focusing on the present. This can lead to a lack of enjoyment or effectiveness while engaging in valued activities (being on "autopilot"), missing opportunities to take effective, meaningful action, and other challenges. Mindfulness- and acceptance-based approaches include a variety of strategies to help patients be more mindful of the present.

One core set of strategies are mindfulness exercises. These might include more concentration-based meditation exercises in which patients focus on an experience (e.g., breathing) and practice compassionately noticing it and returning their attention to it when the mind wanders. These also might

include exercises focused more on flexible attention—being able to shift to notice a variety of experiences in the present moment rather than "getting stuck" on any one experience.

Patients are guided on how to generalize the mindfulness developed in these formal exercises to activities in which they engage throughout the day, bringing the same mindful attentive qualities to their everyday lives. This often also includes being mindful in the process of therapeutic interactions (Wilson & DuFrene, 2009). Therapy provides a perfect context for helping teach patients how to "slow down" in the moment, become more aware of their internal reactions and what is happening around them in the moment, and to purposefully engage in meaningful actions. Clinicians can model this for patients, describing with a slow, purposeful quality what their experiences are and then eliciting a similar mindful stance from patients. Clinicians might also prompt patients to notice particular experiences, such as emotions, thoughts, and sensations in their body. The key is that the conversation maintains a present-focused, compassionate, and accepting stance, so that experiences are noticed and welcomed just for what they are.

Practicing Acceptance With Anxiety. GAD is often associated with emotional reactivity and difficulties regulating emotions. Patients struggle to be "with" their anxiety and other emotions, because these feelings tend to be experienced as overly intense, uncontrollable, and possibly even dangerous. Part of acceptance work is letting go of trying to make these unwanted emotions go away, while also orienting patients toward what to do instead of avoidance.

One way of practicing acceptance is to engage in meaningful actions while accepting whatever thoughts and feelings arise. A patient might be guided in how to commit to a "bold move," in which they choose to do something important despite the fact that anxious thoughts and feelings may arise. An important part of this practice is to be open and compassionate towards the inner experiences that arise during such bold moves. In other words, the idea is not to "white knuckle" through an anxiety-provoking situation, but to truly accept anxiety as the patient mindfully engages in the activity. Similar to the treatment described for OCD previously, this fits with in vivo exposure strategies, except with a focus on practicing acceptance of inner experiences and engaging in valued action, rather than focusing on habituation to feared situations or changes in dysfunctional beliefs to reduce distress.

Another way of practicing acceptance is by actively "leaning in" to previously avoided emotions with mindfulness exercises. For example, patients might be guided through steps such as acknowledging and labeling the emotion they are experiencing, observing where they feel it in their body and what sensations are associated with it, using their breath as a way of actively opening up to the emotion (e.g., imagine breathing into where that emotion is in their body), welcoming the emotion (e.g., repeating "welcome anxiety, my old friend"), and so on (see Harris, 2009). These mindfulness strategies provide another way of actively practicing acceptance as an alternative to

experiential avoidance, particularly as patients become more psychologically flexible and willing to fully embrace painful internal experiences.

Common Treatment Themes

This section summarizes overarching therapeutic ideas covered in the preceding OCD and GAD treatment discussions. These broader themes can be used to inform a range of clinical presentations related to fear and anxiety.

Case Conceptualization

As with all psychological interventions, mindfulness- and acceptance-based therapies are based on a theoretically driven case conceptualization, which guides the ensuing therapeutic process. When hypothesizing mindfulness and acceptance skill deficits as key etiological or maintaining mechanisms, the clinician should explore what these processes look like and how they function in the patient's life. Typically, clinicians will find that the answers to these questions tend to be similar, regardless of clinical presentation. Common avoidance or control strategies include emotional suppression, self-talk (e.g., reassurance, rationalization), and distraction, as well as more extreme examples of avoidance such as substance use or self-harm. Avoidance generally provides short-term relief from distress, although patients may note that the long-term consequence of avoidance is disengagement from meaningful activities. Clarifying these various aspects of the presenting concern and sharing one's case conceptualization with the patient can form a solid foundation on which to base the rest of therapy. With the clinician and patient on the same page about how fear and anxiety are getting in the way of valued living, both can then collaboratively formulate treatment goals to move the latter toward the life they would like to live.

Intervention

Because mindfulness- and acceptance-based techniques are more focused on ineffective behavioral responses to stimuli than on the stimuli per se, common themes emerge across the interventions described for OCD and GAD. Namely, both protocols outlined are grounded in a general assessment of the function of anxiety in the patient's life and aim to train different, more effective, ways of interacting with anxiety. The goal is not to change the frequency or intensity of anxiety. The skills taught include mindfulness, acceptance, and defusion, which encourage taking an open, nonjudgmental, observing stance toward difficult thoughts, feelings, and sensations in the service of chosen values—this set of skills is referred to as psychological flexibility. From this perspective, anxiety does not need to be changed per se; rather, the way anxiety is responded to can be directly targeted, with the aim being to facilitate mindfulness and acceptance.

Getting patients to listen to their lived experience, rather than to the rules issued by their minds, is an important first step in therapy because

mindfulness- and acceptance-based interventions emphasize experiential learning. Related to this, behavioral exercises are an important component of these interventions, with the objective of giving patients the opportunity to practice interacting with fear and anxiety in new ways. Guidance from the clinician when first starting exercises can be especially valuable as it frames the purpose of the exercises—to learn how to be open to anxiety while engaging in meaningful behavior.

Sometimes, it may be difficult to set up opportunities for purposeful behavior within the confines of a therapy room. For example, it would be challenging to conduct an exposure with patients with OCD whose fear of contamination affects their ability to play with their children. If that is the case, it may be helpful for the clinician to elicit from the patient the link between exercises practiced in session and valued behavior outside of session. Questions such as, "How may this activity apply to your life?" or "What would it mean for you if you were able to be truly open to anxiety, as you were just now, in your struggle with ____?" can prompt patients to think about their reason for engaging in an experiential task. In the previous example, the clinician may design an exercise in which the patient interacts with a feared stimulus (e.g., dirt) while allowing all kinds of internal experiences to "show up." The act of touching dirt may not connect with any specific patient value, but making an intentional choice to engage in a difficult task to expand one's behavioral repertoire can be done in the service of ultimately engaging in meaningful valued behavior outside the therapy room.

The specific skills taught and the method of case conceptualization are similar across anxiety disorders and OCD. Although the content of distressing stimuli and types of avoidance behaviors can look vastly different within the same patient or from one patient to the next, the clinician can stay anchored in a mindfulness and acceptance framework by returning to a functional understanding of the patient's concerns and the goals of therapy.

OUTCOME INDICATORS

Given the functional stance of mindfulness- and acceptance-based interventions, metrics for treatment outcome evaluation emphasize effective ways of interacting with internal experiences and behavioral consistency with values (i.e., psychological flexibility) rather than symptom severity. Measures that focus on valued living, the primary outcome of interest, are considered a more useful way to gauge treatment progress than are measures of distress per se. Although there are many exemplary measures, those included in Table 18.2 have demonstrated sensitivity to treatment effects in individuals with clinically severe anxiety (e.g., Arch, Wolitzky-Taylor, Eifert, & Craske, 2012; Carmody, Baer, Lykins, & Olendzki, 2009; Craske et al., 2014; Forman, Herbert, Moitra, Yeomans, & Geller, 2007; Villatte et al., 2016; Wersebe et al., 2017).

It is also possible to determine patients' progress based on their responses in therapy; however, use of standardized measures may reveal specific areas

TABLE 18.2. Self-Report Assessment Measures of Treatment Progress

Measure name	Source
Valued Living	
Bull's-Eye Values Survey	Lundgren, Luoma, Dahl, Strosahl, and Melin (2012)
Valued Living Questionnaire	Wilson, Sandoz, Kitchens, and Roberts (2010)
Quality of Life Inventory	Frisch et al. (2005)
Psychological Flexibility	
Acceptance and Action Questionnaire—II	Bond et al. (2011)
Defusion	
Believability of Anxious Feelings and Thoughts Questionnaire	Herzberg et al. (2012)
Mindfulness	
Mindful Attention Awareness Scale	Brown and Ryan (2003)
Five Facet Mindfulness Questionnaire (FFMQ)	Baer, Smith, Hopkins, Krietemeyer, and Toney (2006)
15-item FFMQ (FFMQ-15; brief version)	Gu et al. (2016)

in which patients struggle (e.g., nonjudgmental aspect of mindfulness) and can be used to track progress on a particular skill over time. Similarly, valued behavior can be assessed informally with individualized behavioral commitments assigned to patients at each session. It is important that these goals are specific and concrete, so that they can be used as a reliable tracking tool.

EMPIRICAL SUPPORT

Randomized controlled trials for anxiety disorders and OCD have found that psychological flexibility, acceptance, and cognitive defusion mediate treatment outcomes, including symptom severity, anxiety-related behavioral avoidance, and quality of life (Arch et al., 2012; Forman et al., 2007; Twohig, Plumb Vilardaga, Levin, & Hayes, 2015). Improvement in acceptance has been found to significantly predict self-reported quality of life at posttreatment, controlling for baseline quality of life, as well as predict treatment responder status (S. A. Hayes, Orsillo, & Roemer, 2010). Thus, psychological flexibility and its component processes appear to be important to target in therapy.

Furthermore, some evidence suggests that an increase in valued behaviors precedes a reduction in suffering (distress due to anxiety) but not the other way around (Gloster et al., 2017). Increases in valued action have also been associated with higher levels of functioning and lower levels of panic symptoms among participants with a diagnosis of panic disorder (Wersebe et al., 2017). These studies underscore the importance of establishing values-based behavioral commitments in order to achieve improvement in well-being.

Treatment manuals that describe acceptance-based interventions for clinical anxiety in detail can be found online at https://contextualscience.org/treatment_protocols. Clinicians who would like more information on acceptance-based procedures for anxiety are also referred to *Acceptance and Commitment Therapy for Anxiety Disorders: A Practitioner's Treatment Guide to Using Mindfulness, Acceptance, and Values-Based Behavior Change Strategies* (Eifert & Forsyth, 2005). Another resource that focuses on integrating mindfulness and acceptance into their cognitive behavioral approaches is *Mindfulness- and Acceptance-Based Behavioral Therapies in Practice* (Roemer & Orsillo, 2009).

TROUBLESHOOTING

This section presents possible challenges and contraindications in the use of mindfulness- and acceptance-based techniques with clinical anxiety. Because much of the available data come from therapeutic approaches that emphasize the use of formal meditation (i.e., MBSR, MBCT), these comprise the bulk of what is reviewed here. Although therapies that emphasize informal mindfulness exercises do not *require* the inclusion of formal meditation, depending on clinician style, preference, or expertise, or on patient presentation, these therapies can and often do include formal meditation in their actual implementation. This discussion pertains mainly to the therapeutic use of formal meditation with considerations for the use of informal mindfulness near its end.

Formal Meditation Practice

It is generally recognized that to date there has been a lack of systematic investigation into the possible adverse effects of mindfulness (Dobkin, Irving, & Amar, 2012; Hanley, Abell, Osborn, Roehrig, & Canto, 2016; Lustyk, Chawla, Nolan, & Marlatt, 2009). Most of the available information on contraindications of mindfulness comes from case studies and clinical anecdotes, both of which focus mainly on the effects of formal meditation practices. One exception is a naturalistic study that looked at adverse effects of formal meditation in 27 long-term meditators following either a 2-week or 3-month residential meditation retreat (Shapiro, 1992). Effects of meditation were measured at three time points before and after the retreat. Shapiro (1992) found that 38% to 55.5% of participants reported at least one adverse experience at different time points. Two participants (7.4%) experienced profound adverse effects. Adverse effects included intrapersonal (e.g., boredom, pain), interpersonal (e.g., increased judgment of others), and societal (e.g., increased alienation and discomfort with the real world). Other adverse effects that have been reported in association with meditation include depersonalization and derealization, psychosis, and feelings of mania (Lustyk et al., 2009). Many reports are associated with intensive meditation retreats or intensive unguided practice

and connected to individuals with a history of severe mental illness (Kuijpers, van der Heijden, Tuinier, & Verhoeven, 2007; VanderKooi, 1997).

Drawing conclusions on the safety of mindfulness as a therapeutic intervention from the previous literature may be problematic because, in the context of mindfulness-based interventions, meditation duration does not approach the intensity of that which occurs on a retreat. Considering meditation in a therapeutic context, a systematic review of yoga and meditation for medical illnesses found no serious adverse effects, although only one study (out of the 20 included studies) explicitly reported monitoring participants for such effects (Arias, Steinberg, Banga, & Trestman, 2006). Arias et al. (2006) also conducted an unsystematic review and concluded that such effects are rare and tend to be associated with "misuse or overuse of meditation" (pg. 823).

In the context of formal meditation, it appears that serious adverse effects can occur when meditation is undertaken in an intensive, unguided manner and with those who have a history of severe mental illness. Therefore, clinicians using meditation as a therapeutic tool should be experienced in both meditation and psychotherapy, and patient meditation practices should be monitored to ensure that meditation is not occurring improperly or to excess. Meditation may be contraindicated for some individuals with a history of severe mental illness, especially psychosis. Patients should, therefore, be screened prior to beginning meditation. A number of screening procedures have been developed for this purpose (see Dobkin et al., 2012; Lustyk et al., 2009). If adverse effects do occur, it is recommended to decrease or discontinue meditation practice (VanderKooi, 1997).

Informal Mindfulness Practice

Many mindfulness-based interventions do not necessarily employ formal meditation. For example, ACT (S. C. Hayes et al., 2011) and DBT (Linehan, 1993) include short, informal mindfulness exercises, although individual clinicians may include more formal practices if they choose. Evidence for adverse effects of short, informal practices is sparse. Within the literature, one finding following treatment with a mindfulness-based intervention has been an increase in the number of symptoms but a decrease in the functional impact of those symptoms. For example, in 80 inpatients with positive psychotic symptoms, Bach and Hayes (2002) showed that the number of participants reporting symptoms increased when following an ACT protocol compared to treatment as usual, but the number of participants who were rehospitalized decreased. The authors suggested that these results may have been due to greater awareness and acceptance, and decreased believability, of symptoms. In other words, mindfulness may facilitate greater awareness of internal experiences, both pleasant and unpleasant, but less identification with and reactivity to those experiences (Kostanski & Hassed, 2008). The Bach and Hayes study has since been replicated with similar effects (Bach,

Gaudiano, Hayes, & Herbert, 2013; Bach, Hayes, & Gallop, 2012). In light of the possible adverse effects of meditation in individuals with a history of psychosis, these findings suggest that such patients may benefit from a therapy that includes short duration, informal mindfulness practices (e.g., ACT) over longer duration, formal meditation (e.g., MBSR).

In sum, on the basis of the limited empirical data available, adverse effects can result from mindfulness, although they seem to be rare. When considering this topic, it is important to keep in mind that the term *adverse* is subjective and, in Western society, most unpleasant experiences are interpreted as "adverse." However, mindfulness has its roots in Eastern philosophical and religious traditions and what may be considered "adverse" in the West due to its unpleasant nature is neither inherently nor necessarily so. Rather, psychological events such as sadness, stress, and even "depersonalization" should be considered in the context of the impact they have on an individual's life functioning. If greater awareness of unpleasant experiences ultimately leads to a better ability to cope with those experiences and more flexible functioning in one's life, then those experiences may be beneficial. It is this very awareness that was originally identified as integral to the path leading to the end of suffering as laid out by the Buddha over 2,600 years ago.

CONCLUSION

Interventions that focus on mindfulness- and acceptance-based processes of change are employed in various multicomponent empirically supported therapies, including ACT, DBT, MBSR, and MBCT. In Western psychology, mindfulness typically refers to noticing experiences as they occur in the present, whereas acceptance describes being open to those experiences in a nonjudgmental way (e.g., psychological flexibility as described in Chapter 7). Mindfulness- and acceptance-based approaches tend to emphasize intrinsically meaningful treatment goals identified by the patient and experiential exercises to train relevant skills. Furthermore, such interventions are more concerned with how patients respond to unpleasant stimuli (e.g., distress) rather than the stimuli per se. As such, skills are focused on changing responses to difficult experiences not the experiences themselves. The ultimate goal from a mindfulness- and acceptance-based standpoint is to enhance well-being and alleviate suffering rather than reduce symptoms.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

American Psychological Association, Presidential Task Force on Evidence-Based Practice. (2006). Evidence-based practice in psychology. *American Psychologist*, *61*, 271–285. http://dx.doi.org/10.1037/0003-066X.61.4.271

Anālayo. (2003). *Satipaṭṭhāna: The direct path to realization*. Birmingham, England: Windhorse Publications.

Arch, J. J., Wolitzky-Taylor, K. B., Eifert, G. H., & Craske, M. G. (2012). Longitudinal treatment mediation of traditional cognitive behavioral therapy and acceptance and commitment therapy for anxiety disorders. *Behaviour Research and Therapy*, *50*, 469–478. http://dx.doi.org/10.1016/j.brat.2012.04.007

Arias, A. J., Steinberg, K., Banga, A., & Trestman, R. L. (2006). Systematic review of the efficacy of meditation techniques as treatments for medical illness. *Journal of Alternative and Complementary Medicine*, *12*, 817–832. http://dx.doi.org/10.1089/acm.2006.12.817

Bach, P., Gaudiano, B. A., Hayes, S. C., & Herbert, J. D. (2013). Acceptance and commitment therapy for psychosis: Intent to treat, hospitalization outcome and mediation by believability. *Psychosis*, *5*, 166–174. http://dx.doi.org/10.1080/17522439.2012.671349

Bach, P., & Hayes, S. C. (2002). The use of acceptance and commitment therapy to prevent the rehospitalization of psychotic patients: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, *70*, 1129–1139. http://dx.doi.org/10.1037/0022-006X.70.5.1129

Bach, P., Hayes, S. C., & Gallop, R. (2012). Long-term effects of brief acceptance and commitment therapy for psychosis. *Behavior Modification*, *36*, 165–181. http://dx.doi.org/10.1177/0145445511427193

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*, 27–45. http://dx.doi.org/10.1177/1073191105283504

Bhikkhu, T. (2008). *Mindfulness defined. Access to insight*. Retrieved from http://www.accesstoinsight.org/lib/authors/thanissaro/mindfulnessdefined.html

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., . . . Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*, *42*, 676–688. http://dx.doi.org/10.1016/j.beth.2011.03.007

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*, 822–848. http://dx.doi.org/10.1037/0022-3514.84.4.822

Carmody, J., Baer, R. A., Lykins, E. L. B., & Olendzki, N. (2009). An empirical study of the mechanisms of mindfulness in a mindfulness-based stress reduction program. *Journal of Clinical Psychology*, *65*, 613–626. http://dx.doi.org/10.1002/jclp.20579

Craske, M. G., Niles, A. N., Burklund, L. J., Wolitzky-Taylor, K. B., Vilardaga, J. C. P., Arch, J. J., . . . Lieberman, M. D. (2014). Randomized controlled trial of cognitive behavioral therapy and acceptance and commitment therapy for social phobia: Outcomes and moderators. *Journal of Consulting and Clinical Psychology*, *82*, 1034–1048. http://dx.doi.org/10.1037/a0037212

Dobkin, P. L., Irving, J. A., & Amar, S. (2012). For whom may participation in a mindfulness-based stress reduction program be contraindicated? *Mindfulness*, *3*, 44–50. http://dx.doi.org/10.1007/s12671-011-0079-9

Eifert, G. H., & Forsyth, J. P. (2005). *Acceptance and commitment therapy for anxiety disorders: A practitioner's treatment guide to using mindfulness, acceptance, and values-based behavior change strategies*. Oakland, CA: Harbinger.

Forman, E. M., Herbert, J. D., Moitra, E., Yeomans, P. D., & Geller, P. A. (2007). A randomized controlled effectiveness trial of acceptance and commitment therapy and cognitive therapy for anxiety and depression. *Behavior Modification*, *31*, 772–799. http://dx.doi.org/10.1177/0145445507302202

Frisch, M. B., Clark, M. P., Rouse, S. V., Rudd, M. D., Paweleck, J. K., Greenstone, A., & Kopplin, D. A. (2005). Predictive and treatment validity of life satisfaction and the quality of life inventory. *Assessment*, *12*, 66–78. http://dx.doi.org/10.1177/1073191104268006

Gloster, A. T., Klotsche, J., Ciarrochi, J., Eifert, G., Sonntag, R., Wittchen, H.-U., & Hoyer, J. (2017). Increasing valued behaviors precedes reduction in suffering: Findings

from a randomized controlled trial using ACT. *Behaviour Research and Therapy, 91,* 64–71. http://dx.doi.org/10.1016/j.brat.2017.01.013

Grossman, P., & Van Dam, N. T. (2011). Mindfulness, by any other name . . .: Trials and tribulations of *sati* in western psychology and science. *Contemporary Buddhism, 12,* 219–239. http://dx.doi.org/10.1080/14639947.2011.564841

Gu, J., Strauss, C., Crane, C., Barnhofer, T., Karl, A., Cavanagh, K., & Kuyken, W. (2016). Examining the factor structure of the 39-item and 15-item versions of the Five Facet Mindfulness Questionnaire before and after mindfulness-based cognitive therapy for people with recurrent depression. *Psychological Assessment, 28,* 791–802. http://dx.doi.org/10.1037/pas0000263

Hanley, A. W., Abell, N., Osborn, D. S., Roehrig, A. D., & Canto, A. I. (2016). Mind the gaps: Are conclusions about mindfulness entirely conclusive? *Journal of Counseling & Development, 94,* 103–113. http://dx.doi.org/10.1002/jcad.12066

Harris, R. (2009). *ACT made simple: An easy-to-read primer on Acceptance and Commitment Therapy.* Oakland, CA: New Harbinger.

Hayes, S. A., Orsillo, S. M., & Roemer, L. (2010). Changes in proposed mechanisms of action during an acceptance-based behavior therapy for generalized anxiety disorder. *Behaviour Research and Therapy, 48,* 238–245. http://dx.doi.org/10.1016/j.brat.2009.11.006

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2011). *Acceptance and commitment therapy: The process and practice of mindful change* (2nd ed.). New York, NY: Guilford Press.

Hayes-Skelton, S. A., Roemer, L., & Orsillo, S. M. (2013). A randomized clinical trial comparing an acceptance-based behavior therapy to applied relaxation for generalized anxiety disorder. *Journal of Consulting and Clinical Psychology, 81,* 761–773. http://dx.doi.org/10.1037/a0032871

Herzberg, K. N., Sheppard, S. C., Forsyth, J. P., Credé, M., Earleywine, M., & Eifert, G. H. (2012). The Believability of Anxious Feelings and Thoughts Questionnaire (BAFT): A psychometric evaluation of cognitive fusion in a nonclinical and highly anxious community sample. *Psychological Assessment, 24,* 877–891. http://dx.doi.org/10.1037/a0027782

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness.* New York, NY: Random House.

Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life.* New York, NY: Hyperion.

Kostanski, M., & Hassed, C. (2008). Mindfulness as a concept and a process. *Australian Psychologist, 43,* 15–21. http://dx.doi.org/10.1080/00050060701593942

Kuijpers, H. J. H., van der Heijden, F. M. M. A., Tuinier, S., & Verhoeven, W. M. A. (2007). Meditation-induced psychosis. *Psychopathology, 40,* 461–464. http://dx.doi.org/10.1159/000108125

Levin, M. E., Hildebrandt, M. J., Lillis, J., & Hayes, S. C. (2012). The impact of treatment components suggested by the psychological flexibility model: A meta-analysis of laboratory-based component studies. *Behavior Therapy, 43,* 741–756. http://dx.doi.org/10.1016/j.beth.2012.05.003

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder.* New York, NY: Guilford Press.

Linehan, M. M. (2014). *DBT® skills training manual* (2nd ed.). New York, NY: Guilford Press.

Lundgren, T., Luoma, J. B., Dahl, J., Strosahl, K., & Melin, L. (2012). The Bull's-Eye Values Survey: A psychometric evaluation. *Cognitive and Behavioral Practice, 19,* 518–526. http://dx.doi.org/10.1016/j.cbpra.2012.01.004

Lustyk, M. K., Chawla, N., Nolan, R. S., & Marlatt, G. A. (2009). Mindfulness meditation research: Issues of participant screening, safety procedures, and researcher training. *Advances in Mind-Body Medicine, 24,* 20–30.

Olatunji, B. O., Davis, M. L., Powers, M. B., & Smits, J. A. J. (2013). Cognitive-behavioral therapy for obsessive-compulsive disorder: A meta-analysis of treatment outcome and moderators. *Journal of Psychiatric Research*, *47*, 33–41. http://dx.doi.org/10.1016/j.jpsychires.2012.08.020

Öst, L.-G., Havnen, A., Hansen, B., & Kvale, G. (2015). Cognitive behavioral treatments of obsessive-compulsive disorder. A systematic review and meta-analysis of studies published 1993–2014. *Clinical Psychology Review*, *40*, 156–169. http://dx.doi.org/10.1016/j.cpr.2015.06.003

Roemer, L., & Orsillo, S. M. (2005). An acceptance-based behavior therapy for generalized anxiety disorder. In S. M. Orsillo & L. Roemer (Eds.), *Acceptance and mindfulness-based approaches to anxiety: Conceptualization and treatment* (pp. 213–240). New York, NY: Springer. http://dx.doi.org/10.1007/0-387-25989-9_9

Roemer, L., & Orsillo, S. M. (2009). Mindfulness- and acceptance-based behavioral therapies in practice. In J. B. Persons (Series Ed.), *Guides to individualized evidence-based treatment*. New York, NY: Guilford Press.

Roemer, L., Orsillo, S. M., & Salters-Pedneault, K. (2008). Efficacy of an acceptance-based behavior therapy for generalized anxiety disorder: Evaluation in a randomized controlled trial. *Journal of Consulting and Clinical Psychology*, *76*, 1083–1089. http://dx.doi.org/10.1037/a0012720

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2013). *Mindfulness-based cognitive therapy for depression* (2nd ed.). New York, NY: Guilford Press.

Shafran, R., Thordarson, D. S., & Rachman, S. (1996). Thought-action fusion in obsessive compulsive disorder. *Journal of Anxiety Disorders*, *10*, 379–391. http://dx.doi.org/10.1016/0887-6185(96)00018-7

Shapiro, D. H., Jr. (1992). Adverse effects of meditation: A preliminary investigation of long-term meditators. *International Journal of Psychosomatics*, *39*, 62–67.

Tolin, D. F. (2009). Alphabet Soup: ERP, CT, and ACT for OCD. *Cognitive and Behavioral Practice*, *16*, 40–48. http://dx.doi.org/10.1016/j.cbpra.2008.07.001

Twohig, M. P. (2009). The application of acceptance and commitment therapy to obsessive-compulsive disorder. *Cognitive and Behavioral Practice*, *16*, 18–28. http://dx.doi.org/10.1016/j.cbpra.2008.02.008

Twohig, M. P., Abramowitz, J. S., Bluett, E. J., Fabricant, L. E., Jacoby, R. J., Morrison, K. L., . . . Smith, B. M. (2015). Exposure therapy for OCD from an acceptance and commitment therapy (ACT) framework. *Journal of Obsessive-Compulsive and Related Disorders*, *6*, 167–173. http://dx.doi.org/10.1016/j.jocrd.2014.12.007

Twohig, M. P., Abramowitz, J. S., Smith, B. M., Fabricant, L. E., Jacoby, R. J., Morrison, K. L., . . . Ledermann, T. (2018). Adding acceptance and commitment therapy to exposure and response prevention for obsessive-compulsive disorder: A randomized controlled trial. *Behaviour Research and Therapy*, *108*, 1–9. http://dx.doi.org/10.1016/j.brat.2018.06.005

Twohig, M. P., Hayes, S. C., Plumb, J. C., Pruitt, L. D., Collins, A. B., Hazlett-Stevens, H., & Woidneck, M. R. (2010). A randomized clinical trial of acceptance and commitment therapy versus progressive relaxation training for obsessive-compulsive disorder. *Journal of Consulting and Clinical Psychology*, *78*, 705–716. http://dx.doi.org/10.1037/a0020508

Twohig, M. P., Plumb Vilardaga, J. C., Levin, M. E., & Hayes, S. C. (2015). Changes in psychological flexibility during acceptance and commitment therapy for obsessive compulsive disorder. *Journal of Contextual Behavioral Science*, *4*, 196–202. http://dx.doi.org/10.1016/j.jcbs.2015.07.001

VanderKooi, L. (1997). Buddhist teachers' experience with extreme mental states in Western meditators. *Journal of Transpersonal Psychology*, *29*, 31–46.

Villatte, J. L., Vilardaga, R., Villatte, M., Plumb Vilardaga, J. C., Atkins, D. C., & Hayes, S. C. (2016). Acceptance and Commitment Therapy modules: Differential impact

on treatment processes and outcomes. *Behaviour Research and Therapy*, 77, 52–61. http://dx.doi.org/10.1016/j.brat.2015.12.001

Wersebe, H., Lieb, R., Meyer, A. H., Hoyer, J., Wittchen, H.-U., & Gloster, A. T. (2017). Changes of valued behaviors and functioning during an acceptance and commitment therapy intervention. *Journal of Contextual Behavioral Science*, 6, 63–70. http://dx.doi.org/10.1016/j.jcbs.2016.11.005

Wilson, K. G., & DuFrene, T. (2009). *Mindfulness for two: An acceptance and commitment therapy approach to mindfulness in psychotherapy*. Oakland, CA: New Harbinger.

Wilson, K. G., Sandoz, E. K., Kitchens, J., & Roberts, M. (2010). The Valued Living Questionnaire: Defining and measuring valued action within a behavioral framework. *The Psychological Record*, 60, 249–272. http://dx.doi.org/10.1007/BF03395706

19

Pharmacological Enhancement of Extinction Learning

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Cognitive behavior therapy (CBT) is the gold-standard treatment for anxiety disorders, obsessive-compulsive disorder (OCD), and posttraumatic stress disorder (PTSD; American Psychiatric Association, 2009; Gene-Cos, 2006; Koran, Hanna, Hollander, Nestadt, & Simpson, 2007; National Collaborating Centre for Mental Health, 2011, 2013; Ursano et al., 2004). The core component of CBT is exposure to objects or situations that provoke fear and anxiety, which relies on fear extinction processes (Lissek et al., 2005). Although the efficacy of exposure-based CBT has been consistently demonstrated both in adults and youth (Abramowitz, Deacon, & Whiteside, 2019; Olatunji, Cisler, & Deacon, 2010), a substantial proportion of individuals do not benefit or respond only partially to treatment or experience symptom relapse upon discontinuation (McGuire, Lewin, & Storch, 2014; Olatunji et al., 2010). Moreover, the burden associated with treatment or limited access to adequate treatment providers constitute challenges for the implementation of interventions of sufficient duration (McGuire et al., 2014; Olatunji et al., 2010), underlining the necessity of improving and/or accelerating CBT outcomes.

With this aim, studies have emerged investigating the capacity of pharmacological cognitive enhancers to augment exposure-based CBT. The use of cognitive enhancers derives from animal models of fear extinction that have allowed the identification of pharmacologic agents that can augment fear extinction mechanisms (Davis, Ressler, Rothbaum, & Richardson, 2006).

Hence, instead of directly reducing fear and anxiety symptoms as in the traditional use of pharmacotherapy (e.g., with selective serotonin reuptake inhibitors [SSRIs] or benzodiazepines), cognitive enhancers are substances that can exert specific influences on brain regions and neurocircuitry involved in fear learning and extinction (Singewald, Schmuckermair, Whittle, Holmes, & Ressler, 2015). Consequently, these psychopharmacological agents have the potential to enhance exposure-based CBT outcomes.

The chemical substrate D-cycloserine (DCS) is the most extensively investigated cognitive enhancer to augment exposure-based CBT in individuals with anxiety and OCD (Storch et al., 2010; Sulkowski et al., 2014). DCS is a partial N-methyl-D-aspartate (NMDA) agonist acting on the NMDA receptor complex that was originally used for the treatment of tuberculosis (Hofmann, Pollack, & Otto, 2006). Information on its safety and management is well documented, and very low risks of side effects are reported (Storch et al., 2010). DCS specifically facilitates learning of emotion-relevant stimuli and may particularly influence learning of fear and safety associations (Kalisch et al., 2009). Animal studies suggest DCS facilitates extinction of conditioned fear by enhancing safety learning and maintaining and consolidating treatment gains (McGuire, Wu, Piacentini, McCracken, & Storch, 2017; Storch et al., 2010). DCS may also prevent the relapse of anxiety when reexposed to anxiety-evoking stimuli by interfering with the reinstatement of the original fear memories (McGuire et al., 2017; Storch et al., 2010). In other words, DCS may augment the effects and speed the pace of exposure learning, such that patients may need fewer sessions to experience significant improvements in fear and anxiety (Chasson et al., 2010). In addition, the effects of DCS may facilitate generalization of treatment gains to other anxiety-provoking stimuli and situations (Sulkowski, Lewin, & Storch, 2012).

IMPLEMENTATION

Conditions of Implementation

A basic, critical criterion for using DCS is the conjunction with exposure-based therapy. Unlike other types of medication, such as anxiolytics and SSRIs, that can directly reduce fear and anxiety symptoms, DCS specifically facilitates memory processes involved in fear extinction (Norberg, Krystal, & Tolin, 2008). Hence, DCS must be considered as an adjunctive component of CBT rather than as a stand-alone treatment per se. Another important point to consider is the need for a medical prescription by a registered physician or nurse practitioner in order to access DCS. Even with this, however, access is not easy because DCS is not readily available in most pharmacies. Furthermore, regular visits with a medical professional are required to continue to monitor its safety. As DCS is a relatively new clinical approach, guidelines for its effective use in clinical practice are still preliminary. However, as we discuss in this chapter, certain guidelines have been suggested for a successful

implementation of DCS among different populations, including dosage, timing of administration, and duration of treatment.

Target Populations

The administration of DCS to augment exposure-based CBT has been investigated within several populations, including individuals with specific phobia, social anxiety disorder, panic disorder, PTSD, and OCD (for reviews, see Hofmann, Otto, Pollack, & Smits, 2015; McGuire et al., 2017). Although the content of exposure sessions may vary considerably across diagnostic groups, similar dosages, number of doses, and timing of administration have been reported (McGuire et al., 2017). McGuire and colleagues (2017) suggested that because DCS affects memory reconsolidation mechanisms, problems with greater fear-based symptoms and well-defined exposure targets (e.g., specific phobias, social phobia) will show better fear memory reconsolidation in therapy in comparison to conditions with more heterogeneous symptoms (e.g., fear-based symptoms vs. not-just-right OCD symptoms) and more expansive triggers. However, results from recent meta-analyses (Mataix-Cols et al., 2017; McGuire et al., 2017) suggest that the benefits of DCS to exposure-based CBT do not differ for individuals with different anxiety disorders.

There is evidence that the benefits of DCS differ depending on the severity of anxiety symptoms—but in a somewhat unexpected pattern due to a ceiling effect (Byrne, Farrell, Storch, & Rapee, 2014; Norberg et al., 2008). Specifically, individuals with milder anxiety symptoms tend to respond so rapidly to exposure therapy that they do not often require augmentative treatment approaches. Accordingly, relative to no augmentation, such individuals are less likely to evidence effects of DCS. Conversely, those with severe or complex anxiety symptoms are likely to take longer to respond to exposure (Byrne et al., 2014) and, thus, are more likely to show benefit from augmentation with DCS. Moreover, greater symptom severity may lead to an increased motivation to use DCS in patients (Byrne et al., 2014), which can facilitate implementation of treatment. DCS may also be useful for individuals who do not respond to CBT at the expected rate (Otto et al., 2016). Indeed, significant effects of DCS augmentation relative to placebo were reported in a study of youth with OCD recruited specifically because they had failed to respond to CBT alone (Farrell et al., 2013). Hence, DCS implementation may be particularly relevant for more severe or treatment-refractory cases.

Animal studies have suggested important differences in fear extinction processes between young and mature animals (Kim & Richardson, 2010), and it is thought that these differences could lead to differences in DCS response (Byrne et al., 2014). However, the relatively limited DCS literature in youth samples has revealed results similar to those observed with adults regarding efficacy (Byrne et al., 2014; Schneider & Storch, 2019). Further research, however,

is needed to explore age differences in DCS response. Another important aspect of DCS implementation in children is the involvement of parents in treatment-related decisions. Despite minimal risks for side effects, studies have shown that parents are generally not in favor of the use of DCS (Roberts, Farrell, Waters, Oar, & Ollendick, 2016). It is essential, however, that parents feel confident about treatment in order to successfully implement DCS. Fortunately, providing sufficient information on potential risks and benefits leads to significant increases in perceptions of acceptability in parents (Byrne et al., 2014); it is therefore important to provide as much information as needed and discuss any concerns. In particular, it should be communicated that DCS is not a psychotropic medication (Byrne et al., 2014); that it is used only for short periods of time (McGuire et al., 2017); and that the risks of aversive effects (e.g., addiction, side effects) are low, and acute doses are extremely low (Storch et al., 2007, 2008).

Dosage

A great variation in dosage has been employed in previous studies, with doses ranging from 50 mg to 500 mg/day in adult studies (Mataix-Cols et al., 2017; Storch et al., 2010). However, a majority of adult participants (> 80%) received a dosage of 50 mg of DCS (Mataix-Cols et al., 2017), and recent reviews and meta-analyses have reported a lack of additional benefits for elevated doses of DCS (e.g., 250 mg/day or over; Hofmann et al., 2015; Mataix-Cols et al., 2017; McGuire et al., 2017; Storch et al., 2010). In children, dosage is usually adjusted to the child's weight (e.g., 0.7 mg/kg/day), and doses ranging between 25 mg and 70 mg have been reported (Byrne et al., 2014; Mataix-Cols et al., 2017; Storch et al., 2010, 2016). Of note, transient adverse effects (i.e., transient motor tics and echolalia) were reported at higher doses (e.g., 85 mg or 2.8 mg/kg/day) in one study of youth with autistic spectrum disorder (Posey et al., 2004). Therefore, relatively low dosages (approximately 30 mg or 0.7 mg/kg/day) have been recommended for children and adolescents (Storch et al., 2010), although there are no clearly established guidelines at the moment.

Timing of Administration

The timing of DCS administration is also important to consider, and administration is recommended within 2 hours before or after completing therapeutic exposure (Norberg et al., 2008). Notably, there are few data supporting postexposure-session dosing—in most studies, DCS was administered prior to exposure sessions. The 2-hour window is suggested in order to reach peak DCS blood levels by the end of the session (Hofmann et al., 2015). If administered too early or too late, the concentrations of DCS may be suboptimal and may compromise the drug's ability to augment exposure. On the other hand, some studies have reported that the effect of DCS varies depending on the success of the exposure session itself—DCS may reinforce "good" but also "bad" exposure sessions (Hofmann et al., 2015). That is, gains (i.e., learning

that the trigger is no longer threatening) may be observed only when fear has habituated and reduced at the end of the exposure session. Conversely, in the absence of habituation and extinction (i.e., the persistence of fear responses to the trigger through the entire exposure session), DCS may actually lead to reinforcement of the fear memory (i.e., reinforcement of beliefs that the trigger is threatening) as the association with threat persists (Hofmann et al., 2015; Otto et al., 2016; Smits et al., 2013).

Animal studies have provided support for a tailored postexposure administration of DCS up to 2 hours after the exposure session (Otto et al., 2016). However, recent studies in youth found no evidence that postexposure administration or success with exposure therapy were associated with better DCS outcomes (Mataix-Cols et al., 2014; Rapee et al., 2016). Moreover, recent meta-analyses of human DCS studies in which the timing of administration ranged between 4 hours prior to 1 hour after exposure session revealed no effects of timing of administration on treatment efficacy (Mataix-Cols et al., 2017; McGuire et al., 2017), suggesting this 5-hour window is adequate for DCS administration. Additional research, however, is needed to determine the ideal timing for DCS administration.

Duration of Treatment

Studies in humans have employed a variable number of DCS doses, ranging from two to 12 doses of DCS across treatment sessions. Treatment response, however, is similar no matter how many DCS-dosed sessions are held (Bontempo, Panza, & Bloch, 2012; Mataix-Cols et al., 2017; McGuire et al., 2017; Norberg et al., 2008). Studies have failed to show additional benefits of chronic dosing on extinction outcomes (Storch et al., 2010), and the efficacy of DCS may be attenuated across the progression of therapy sessions, particularly when the effects of exposure therapy become more apparent (Sulkowski et al., 2012). In animals, prolonged administration of DCS appears to lead to a reduced response, potentially due to a desensitization of NMDA receptors (e.g., Parnas, Weber, & Richardson, 2005). Thus, given the absence of benefits of prolonged administration, which is likely explained by the effects of exposure therapy and the attenuation of DCS effects over time, brief and acute administrations are recommended.

Summary of Implementation

Although clear guidelines have not yet been developed for the implementation of DCS to augment exposure, results from research trials suggest DCS is particularly useful for individuals with more severe anxiety presentations or who do not respond to monotherapy using exposure-based CBT. DCS should be administered at minimal doses (e.g., 50 mg/day for adults and 0.7 mg/kg/day for children) on an acute basis, shortly before or after exposure sessions.

Example of D-Cycloserine Implementation—Deon

Deon is a 36-year-old man who works as an accountant in a landscaping maintenance company.[1] Deon was diagnosed with social anxiety disorder in adolescence. He became particularly anxious when he had to speak in groups (e.g., at the company's cafeteria during lunch time) and always avoided doing so. His anxiety had caused him significant distress as it isolated him from others and prevented him from substantially progressing professionally. Deon started an exposure-based CBT program consisting of twelve 1-hour individual therapy sessions, 10 of which involved some level of exposure. After 4 weeks, Deon had undergone two sessions of exposure and no progress had been observed; despite slight reductions of fear levels at the end of each session (i.e., habituation; see Chapter 14), there were no apparent changes from one session to the other. Of note, Deon had also undergone exposure-based therapy for social anxiety in adolescence and his progress at that time had been very limited. Considering Deon's profile, his therapist suggested using DCS to augment the effects of CBT, a proposition Deon accepted after becoming aware of the negligible risks of side effects.

Deon visited a psychiatrist colleague of his therapist to obtain a prescription of DCS. Exposure sessions three through six were then conducted in which Deon was gradually exposed to calling a stranger on the phone, speaking to a stranger in person, and speaking in front of groups of people. Deon took one 50 mg DCS pill, 1 hour prior to exposure sessions three to six, and Deon's fear level was monitored before and after each exposure session using the subjective units of distress scale (Wolpe, 1958). Additional exposure sessions (seven through 12) were conducted without the use of DCS. His social anxiety severity was also assessed before and after treatment using the Liebowitz Social Anxiety Scale (Liebowitz, 1987); the Sheehan Disability Scale (Sheehan, 1983) was used to assess functional impairment. At the end of session four and then at session six, Deon met with the prescribing psychiatrist to assess for potential adverse effects of DCS (of which there were none) and general health status. A follow-up visit was also scheduled for one month after the end of treatment to monitor Deon's progress.

OUTCOME INDICATORS

Currently, there are no ways to directly measure the biochemical effects of DCS in humans. However, the effects of DCS can be assessed indirectly, through behavioral and self-report measures of fear and anxiety and functional impairment. After successful exposure, the initially feared stimulus (e.g., public speaking) should elicit less distress once encountered as habituation occurs and the individual learns that this trigger is not threatening anymore; this effect should be maintained over time and may generalize to other

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[1]All clinical case material has been altered to protect patient confidentiality.

situations relevant to the individual's particular fear (e.g., eating in public). DCS theoretically helps to improve and accelerate this learning. Accordingly, the effects of DCS can be measured at different time points during the therapeutic process. For instance, progress can be assessed before and after each CBT session, at posttreatment, or at follow-up assessment.

Measures of fear and anxiety may also be used to evaluate treatment outcomes. For instance, the success of exposure sessions can be assessed before and after exposure using self-reported symptom severity, such as the subjective units of distress scale (Wolpe, 1958). Progress can be also assessed by determining how many steps of an exposure hierarchy have been attempted. Disorder- or fear-specific measures can also be used to assess the effects of DCS-reduction in symptom severity. Finally, treatment-related changes may be measured in terms of daily life functioning and illness-related impairment using clinician-administered and self-report scales (e.g., the Clinical Global Impression-Severity and Clinical Global Impression Improvement scales, 1976). Importantly, absent a placebo control, it might be difficult to determine whether changes on such measures are attributable to DCS specifically, or to the effects of exposure therapy.

Regarding the example of Deon, we would expect to observe a reduction of distress vis-à-vis the content of exposure that would be maintained and become more pronounced from one session to another, particularly between sessions three and six. We would also expect to observe reductions in social anxiety levels and functional impairment at posttreatment using psychometrically validated measures (e.g., the Liebowitz Social Anxiety Scale [Liebowitz, 1987]; the Sheehan Disability Scale [Sheehan, 1983]).

EMPIRICAL SUPPORT

Results from individual DCS studies have produced inconsistent results. Accordingly, it is useful to consider meta-analytic reviews that aggregate findings across studies. Large effects ($d = 1.19$) of DCS augmentation of extinction training have been found in animal studies (Norberg et al., 2008). In humans, early meta-analyses suggested overall only moderate benefits of DCS in augmenting exposure with effect sizes of 0.46 to 0.60 at posttreatment and of 0.47 at follow-up (Bontempo et al., 2012; Norberg et al., 2008). These effects, however, appeared to diminish in later studies, with more recent meta-analyses reporting small effects ($d = 0.25$–0.34) of DCS relative to placebo at posttreatment (Mataix-Cols et al., 2017; Rodrigues et al., 2014) or no significant differences with placebo at midtreatment, posttreatment, and/or follow-up (Mataix-Cols et al., 2017; McGuire et al., 2017; Ori et al., 2015). Taken together, these findings, on the average, do not provide evidence for robust effects of DCS augmentation of exposure-based CBT. It has been proposed, however, that there are certain individuals for whom DCS augmentation is efficacious, such as those with higher pretreatment anxiety levels and successful exposure sessions and those not taking antidepressant medications (Hofmann, 2016). Further,

it has been suggested that rather than amplifying the overall exposure effects, DCS accelerates response to exposure, so that the effects are better observed during the first few sessions (Chasson et al., 2010). Conversely, when the number of exposure sessions is large, which allows for increased learning opportunities, the effects of DCS are attenuated over time as the effects of CBT become more apparent (Otto et al., 2016). Faster response to exposure may reduce treatment duration, cost, and premature patient dropout (Byrne et al., 2014); thus, even a modest speeding effect of DCS may be clinically useful. More studies, however, are needed to better understand the underlying mechanisms of DCS and to personalize its use to optimize effects (Schneider & Storch, 2019).

TROUBLESHOOTING

Despite very low risks of aversive side effects, there may be patient-specific considerations as well as contraindications to the use of DCS. First, as we discussed previously, some clinical presentations of anxiety may be more or less suitable for DCS implementation. For instance, there is some evidence that the utility of DCS is limited for mildly anxious individuals who respond quickly to exposure-based CBT alone (Norberg et al., 2008). Although there is no clear evidence that the effects of DCS are dependent on *Diagnostic and Statistical Manual of Mental Disorders* diagnosis, individuals with complex presentations characterized by increased comorbidities, mixed fear-based psychopathologies, and multiple fear triggers (as often observed in OCD and PTSD) may respond less well to exposure and, therefore, benefit less from DCS augmentation (McGuire et al., 2017). A recent meta-analysis also reported poorer outcomes of DCS augmentation of anxiety-focused exposure for individuals with comorbid depression, younger age, or female gender (McGuire et al., 2017). These latter findings suggest that those without comorbid depression, older individuals, and males show increased benefits from DCS augmentation, although further studies are needed to confirm these assumptions.

Another important factor is treatment acceptance. As mentioned previously, patients (and parents of child patients) may be reticent to the use of medication (Byrne et al., 2014), which may affect the implementation of DCS. Treatment acceptability has been suggested as a strong predictor of engagement in the therapeutic process and treatment success (Calvert & Johnston, 1990). Conversely, reluctance to use DCS may reduce motivation towards treatment and generate negative biases within the patient, which may compromise treatment adherence and outcomes.

Currently, it is unclear whether the presence of psychotropic medication is a contraindication in the use of DCS. Some authors have suggested that antidepressants attenuate DCS effects and interfere in the extinction processes necessary for successful exposure (Otto et al., 2016). Although there is some support for this proposal in animals (for a review, see Otto et al., 2016) and humans (Andersson et al., 2015), recent meta-analyses have not

found that antidepressant medication attenuated the effects of DCS augmentation (Mataix-Cols et al., 2017; McGuire et al., 2017). In fact, increased DCS augmentation was observed in studies of anxiety disorders and PTSD in which a greater percentage of patients were taking SSRI medication (McGuire et al., 2017). The authors suggested SSRIs may indirectly strengthen fear extinction learning through enhancing synaptic plasticity of fear extinction (McGuire et al., 2017). Alternatively, a greater percentage of patients on medication might indicate a more severe sample, with greater room for augmentation of exposure with DCS relative to less severe samples. These findings notwithstanding, concomitant SSRI medication does not appear to be a contraindication to DCS use and could even facilitate its effects. Still, studies assessing specifically this question are needed in order to verify this hypothesis.

Finally, in individuals where exposure sessions are unsuccessful (i.e., whose fear levels increase or do not change following exposure), DCS may facilitate fearful learning (Smits et al., 2013). Thus, unsuccessful trials may represent a contraindication for DCS administration. However, mixed findings have been reported in humans regarding this issue (e.g., Rapee et al., 2016; Smits et al., 2013), which deserves to be further explored in the future.

CONCLUSION

Novel strategies using cognitive enhancers have recently emerged with the aim of improving and accelerating psychological treatment outcomes. Building on successful rodent models (e.g., Ledgerwood, Richardson, & Cranney, 2003, 2004, 2005; Walker, Ressler, Lu, & Davis, 2002), the use of DCS to augment exposure-based CBT has gained increased interest over the past decade; studies have been conducted on samples of adults and youth with anxiety disorders, OCD, and PTSD. There is inconsistent evidence regarding the effectiveness of DCS to augment exposure-based CBT. Some studies reported encouraging results, whereas others show no evidence for effects of DCS on CBT outcomes. Knowledge regarding optimal DCS implementation is still limited, and further research is needed to develop guidelines regarding dosage, timing of administration, and contraindications. Nevertheless, there is hope that DCS can be useful for speeding up the effects of exposure therapy for people with more severe anxiety and those who have not benefitted from exposure therapy in the past. Hence, more studies are needed to better guide DCS implementation and to identify critical factors that may moderate treatment effects.

REFERENCES

Abramowitz, J. S., Deacon, B. J., & Whiteside, S. P. H. (2019). *Exposure therapy for anxiety: Principles and practice* (2nd ed.). New York, NY: Guilford Press.

American Psychiatric Association. (2009). *Practice guideline for the treatment of patients with panic disorder* (2nd ed.). Arlington, VA: American Psychiatric Association.

Andersson, E., Hedman, E., Enander, J., Radu Djurfeldt, D., Ljótsson, B., Cervenka, S., . . . Rück, C. (2015). D-Cycloserine vs placebo as adjunct to cognitive behavioral therapy for obsessive-compulsive disorder and interaction with antidepressants: A randomized clinical trial. *JAMA Psychiatry*, *72*, 659–667. http://dx.doi.org/10.1001/jamapsychiatry.2015.0546

Bontempo, A., Panza, K. E., & Bloch, M. H. (2012). D-Cycloserine augmentation of behavioral therapy for the treatment of anxiety disorders: A meta-analysis. *The Journal of Clinical Psychiatry*, *73*, 533–537. http://dx.doi.org/10.4088/JCP.11r07356

Byrne, S. P., Farrell, L. J., Storch, E. A., & Rapee, R. M. (2014). D-Cycloserine augmented treatment of anxiety disorders in children and adolescents: A review of preliminary research. *Psychopathology Review*, *1*, 157–168. http://dx.doi.org/10.5127/pr.033013

Calvert, S. C., & Johnston, C. (1990). Acceptability of treatments for child behavior problems: Issues and implications for future research. *Journal of Clinical Child Psychology*, *19*, 61–74. http://dx.doi.org/10.1207/s15374424jccp1901_8

Chasson, G. S., Buhlmann, U., Tolin, D. F., Rao, S. R., Reese, H. E., Rowley, T., . . . Wilhelm, S. (2010). Need for speed: Evaluating slopes of OCD recovery in behavior therapy enhanced with D-cycloserine. *Behaviour Research and Therapy*, *48*, 675–679. http://dx.doi.org/10.1016/j.brat.2010.03.007

Clinical Global Impressions Scale. (1976). In W. E. Guy (Ed.), *ECDEU assessment manual for psychopharmacology* (Rev. ed., pp. 217–222). Rockville, MD: U.S. Department of Health, Education, and Welfare, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration.

Davis, M., Ressler, K., Rothbaum, B. O., & Richardson, R. (2006). Effects of D-cycloserine on extinction: Translation from preclinical to clinical work. *Biological Psychiatry*, *60*, 369–375. http://dx.doi.org/10.1016/j.biopsych.2006.03.084

Farrell, L. J., Waters, A. M., Boschen, M. J., Hattingh, L., McConnell, H., Milliner, E. L., . . . Storch, E. A. (2013). Difficult-to-treat pediatric obsessive-compulsive disorder: Feasibility and preliminary results of a randomized pilot trial of D-cycloserine-augmented behavior therapy. *Depression and Anxiety*, *30*, 723–731. http://dx.doi.org/10.1002/da.22132

Gene-Cos, N. (2006, September). *Post-traumatic stress disorder: The management of PTSD in adults and children in primary and secondary care*. [Review of the book *Post-traumatic stress disorder: The management of PTSD in adults and children in primary and secondary care*, by National Collaborating Centre for Mental Health]. *The Psychiatrist*, *30*, 357.

Hofmann, S. G. (2016). Schrödinger's cat and D-cycloserine to augment exposure therapy—both are alive and dead. *JAMA Psychiatry*, *73*, 771–772. http://dx.doi.org/10.1001/jamapsychiatry.2016.1132

Hofmann, S. G., Otto, M. W., Pollack, M. H., & Smits, J. A. (2015). D-Cycloserine augmentation of cognitive behavioral therapy for anxiety disorders: An update. *Current Psychiatry Reports*, *17*, 532. http://dx.doi.org/10.1007/s11920-014-0532-2

Hofmann, S. G., Pollack, M. H., & Otto, M. W. (2006). Augmentation treatment of psychotherapy for anxiety disorders with D-cycloserine. *CNS Drug Reviews*, *12*, 208–217. http://dx.doi.org/10.1111/j.1527-3458.2006.00208.x

Kalisch, R., Holt, B., Petrovic, P., De Martino, B., Klöppel, S., Büchel, C., & Dolan, R. J. (2009). The NMDA agonist D-cycloserine facilitates fear memory consolidation in humans. *Cerebral Cortex, 19*, 187–196. http://dx.doi.org/10.1093/cercor/bhn076

Kim, J. H., & Richardson, R. (2010). New findings on extinction of conditioned fear early in development: Theoretical and clinical implications. *Biological Psychiatry*, *67*, 297–303. http://dx.doi.org/10.1016/j.biopsych.2009.09.003

Koran, L. M., Hanna, G. L., Hollander, E., Nestadt, G., & Simpson, H. B. (2007). Practice guideline for the treatment of patients with obsessive-compulsive disorder. *The American Journal of Psychiatry*, *164*(7, Suppl.), 5–53.

Ledgerwood, L., Richardson, R., & Cranney, J. (2003). Effects of ᴅ-cycloserine on extinction of conditioned freezing. *Behavioral Neuroscience*, *117*, 341–349. http://dx.doi.org/10.1037/0735-7044.117.2.341

Ledgerwood, L., Richardson, R., & Cranney, J. (2004). ᴅ-Cycloserine and the facilitation of extinction of conditioned fear: Consequences for reinstatement. *Behavioral Neuroscience*, *118*, 505–513. http://dx.doi.org/10.1037/0735-7044.118.3.505

Ledgerwood, L., Richardson, R., & Cranney, J. (2005). ᴅ-Cycloserine facilitates extinction of learned fear: Effects on reacquisition and generalized extinction. *Biological Psychiatry*, *57*, 841–847. http://dx.doi.org/10.1016/j.biopsych.2005.01.023

Liebowitz, M. R. (1987). Social phobia. In D. F. Klein, *Anxiety. Modern Problems of Pharmacopsychiatry*, *22*, 141–173. http://dx.doi.org/10.1159/000414022

Lissek, S., Powers, A. S., McClure, E. B., Phelps, E. A., Woldehawariat, G., Grillon, C., & Pine, D. S. (2005). Classical fear conditioning in the anxiety disorders: A meta-analysis. *Behaviour Research and Therapy*, *43*, 1391–1424. http://dx.doi.org/10.1016/j.brat.2004.10.007

Mataix-Cols, D., Fernández de la Cruz, L., Monzani, B., Rosenfield, D., Andersson, E., Pérez-Vigil, A., . . . the DCS Anxiety Consortium. (2017). ᴅ-Cycloserine augmentation of exposure-based cognitive behavior therapy for anxiety, obsessive-compulsive, and posttraumatic stress disorders: A systematic review and meta-analysis of individual participant data. *JAMA Psychiatry*, *74*, 501–510. http://dx.doi.org/10.1001/jamapsychiatry.2016.3955

Mataix-Cols, D., Turner, C., Monzani, B., Isomura, K., Murphy, C., Krebs, G., & Heyman, I. (2014). Cognitive-behavioural therapy with post-session ᴅ-cycloserine augmentation for paediatric obsessive-compulsive disorder: Pilot randomised controlled trial. *The British Journal of Psychiatry*, *204*, 77–78. http://dx.doi.org/10.1192/bjp.bp.113.126284

McGuire, J. F., Lewin, A. B., & Storch, E. A. (2014). Enhancing exposure therapy for anxiety disorders, obsessive-compulsive disorder and post-traumatic stress disorder. *Expert Review of Neurotherapeutics*, *14*, 893–910. http://dx.doi.org/10.1586/14737175.2014.934677

McGuire, J. F., Wu, M. S., Piacentini, J., McCracken, J. T., & Storch, E. A. (2017). A meta-analysis of ᴅ-cycloserine in exposure-based treatment: Moderators of treatment efficacy, response, and diagnostic remission. *The Journal of Clinical Psychiatry*, *78*, 196–206. http://dx.doi.org/10.4088/JCP.15r10334

National Collaborating Centre for Mental Health. (2011). *Generalised anxiety disorder in adults: Management in primary, secondary and community care*. Leicester, England: British Psychological Society.

National Collaborating Centre for Mental Health. (2013). *Social anxiety disorder: Recognition, assessment and treatment*. Leicester, England: British Psychological Society.

Norberg, M. M., Krystal, J. H., & Tolin, D. F. (2008). A meta-analysis of ᴅ-cycloserine and the facilitation of fear extinction and exposure therapy. *Biological Psychiatry*, *63*, 1118–1126. http://dx.doi.org/10.1016/j.biopsych.2008.01.012

Olatunji, B. O., Cisler, J. M., & Deacon, B. J. (2010). Efficacy of cognitive behavioral therapy for anxiety disorders: A review of meta-analytic findings. *Psychiatric Clinics of North America*, *33*, 557–577. http://dx.doi.org/10.1016/j.psc.2010.04.002

Ori, R., Amos, T., Bergman, H., Soares-Weiser, K., Ipser, J. C., & Stein, D. J. (2015). *Augmentation of cognitive and behavioural therapies (CBT) with ᴅ-cycloserine for anxiety and related disorders*. Available from Cochrane Database of Systematic Reviews (CD007803). http://dx.doi.org/10.1002/14651858.CD007803.pub2

Otto, M. W., Kredlow, M. A., Smits, J. A. J., Hofmann, S. G., Tolin, D. F., de Kleine, R. A., . . . Pollack, M. H. (2016). Enhancement of psychosocial treatment with ᴅ-cycloserine: Models, moderators, and future directions. *Biological Psychiatry*, *80*, 274–283. http://dx.doi.org/10.1016/j.biopsych.2015.09.007

Parnas, A. S., Weber, M., & Richardson, R. (2005). Effects of multiple exposures to D-cycloserine on extinction of conditioned fear in rats. *Neurobiology of Learning and Memory*, *83*, 224–231. http://dx.doi.org/10.1016/j.nlm.2005.01.001

Posey, D. J., Kem, D. L., Swiezy, N. B., Sweeten, T. L., Wiegand, R. E., & McDougle, C. J. (2004). A pilot study of D-cycloserine in subjects with autistic disorder. *The American Journal of Psychiatry*, *161*, 2115–2117. http://dx.doi.org/10.1176/appi.ajp.161.11.2115

Rapee, R. M., Jones, M. P., Hudson, J. L., Malhi, G. S., Lyneham, H. J., & Schneider, S. C. (2016). D-Cycloserine does not enhance the effects of in vivo exposure among young people with broad-based anxiety disorders. *Behaviour Research and Therapy*, *87*, 225–231. http://dx.doi.org/10.1016/j.brat.2016.10.004

Roberts, C. L., Farrell, L. J., Waters, A. M., Oar, E. L., & Ollendick, T. H. (2016). Parents' Perceptions of Novel Treatments for Child and Adolescent Specific Phobia and Anxiety Disorders. *Child Psychiatry & Human Development*, *47*, 459–471. http://dx.doi.org/10.1007/s10578-015-0579-2

Rodrigues, H., Figueira, I., Lopes, A., Gonçalves, R., Mendlowicz, M. V., Coutinho, E. S. F., & Ventura, P. (2014). Does D-cycloserine enhance exposure therapy for anxiety disorders in humans? A meta-analysis. *PLoS ONE*, *9*, e93519. http://dx.doi.org/10.1371/journal.pone.0093519

Schneider, S. C., & Storch, E. A. (2019). Pharmacologic-augmented treatments. In L. J. Farrell, T. H. Ollendick, & P. Muris (Eds.), *Innovations in CBT for childhood anxiety, OCD, and PTSD: Improving access and outcomes* (pp. 407–427). Cambridge, England: Cambridge University Press.

Sheehan, D. V. (1983). *The anxiety disease*. New York, NY: Scribner.

Singewald, N., Schmuckermair, C., Whittle, N., Holmes, A., & Ressler, K. J. (2015). Pharmacology of cognitive enhancers for exposure-based therapy of fear, anxiety and trauma-related disorders. *Pharmacology & Therapeutics*, *149*, 150–190. http://dx.doi.org/10.1016/j.pharmthera.2014.12.004

Smits, J. A. J., Rosenfield, D., Otto, M. W., Marques, L., Davis, M. L., Meuret, A. E., . . . Hofmann, S. G. (2013). D-cycloserine enhancement of exposure therapy for social anxiety disorder depends on the success of exposure sessions. *Journal of Psychiatric Research*, *47*, 1455–1461. http://dx.doi.org/10.1016/j.jpsychires.2013.06.020

Storch, E. A., McKay, D., Reid, J. M., Geller, D. A., Goodman, W. K., Lewin, A. B., & Murphy, T. K. (2010, July). *D-Cycloserine augmentation of cognitive-behavioral therapy: Directions for pilot research in pediatric obsessive-compulsive disorder.* Paper presented at the Child & Youth Care Forum, Boston, MA.

Storch, E. A., Merlo, L. J., Bengtson, M., Murphy, T. K., Lewis, M. H., Yang, M. C., . . . Goodman, W. K. (2007). D-Cycloserine does not enhance exposure–response prevention therapy in obsessive-compulsive disorder. *International Clinical Psychopharmacology*, *22*, 230–237. http://dx.doi.org/10.1097/YIC.0b013e32819f8480

Storch, E. A., Merlo, L. J., Lehmkuhl, H., Geffken, G. R., Jacob, M., Ricketts, E., . . . Goodman, W. K. (2008). Cognitive-behavioral therapy for obsessive-compulsive disorder: A non-randomized comparison of intensive and weekly approaches. *Journal of Anxiety Disorders*, *22*, 1146–1158. http://dx.doi.org/10.1016/j.janxdis.2007.12.001

Storch, E. A., Murphy, T. K., Goodman, W. K., Geffken, G. R., Lewin, A. B., Henin, A., . . . Geller, D. A. (2010). A preliminary study of D-cycloserine augmentation of cognitive-behavioral therapy in pediatric obsessive-compulsive disorder. *Biological Psychiatry, 68*, 1073–1076. http://dx.doi.org/10.1016/j.biopsych.2010.07.015

Storch, E. A., Wilhelm, S., Sprich, S., Henin, A., Micco, J., Small, B. J., . . . Geller, D. A. (2016). Efficacy of augmentation of cognitive behavior therapy with weight-adjusted D-cycloserine vs placebo in pediatric obsessive-compulsive disorder: A randomized clinical trial. *JAMA Psychiatry*, *73*, 779–788. http://dx.doi.org/10.1001/jamapsychiatry.2016.1128

Sulkowski, M. L., Geller, D. A., Lewin, A. B., Murphy, T. K., Mittelman, A., Brown, A., & Storch, E. A. (2014). The future of D-cycloserine and other cognitive modifiers in obsessive-compulsive and related disorders. *Current Psychiatry Reviews*, *10*, 317–324. http://dx.doi.org/10.2174/1573400510666140619224942

Sulkowski, M. L., Lewin, A. B., & Storch, E. A. (2012). D-Cycloserine augmentation of fear extinction and exposure-based anxiety treatment. In J. Murray (Ed.), *Exposure therapy: New developments* (pp. 217–228). New York, NY: Nova Science Publishers.

Ursano, R. J., Bell, C., Eth, S., Friedman, M., Norwood, A., Pfefferbaum, B., . . . the Steering Committee on Practice Guidelines. (2004). Practice guideline for the treatment of patients with acute stress disorder and posttraumatic stress disorder. *The American Journal of Psychiatry*, *161*(11, Suppl.), 3–31.

Walker, D. L., Ressler, K. J., Lu, K.-T., & Davis, M. (2002). Facilitation of conditioned fear extinction by systemic administration or intra-amygdala infusions of D-cycloserine as assessed with fear-potentiated startle in rats. *The Journal of Neuroscience*, *22*, 2343–2351. http://dx.doi.org/10.1523/JNEUROSCI.22-06-02343.2002

Wolpe, J. (1958). *Psychotherapy by reciprocal inhibition*. Palo Alto, CA: Stanford University Press.

20

Interpretation Bias Modification

Courtney Beard and Andrew D. Peckham

Daily life is full of ambiguity. For example, getting rejected for a job, a friend not returning a call, or a racing heart can all be interpreted in multiple ways. As described in Chapter 2, people with clinical levels of anxiety tend to jump to negative conclusions when faced with ambiguity, which has a substantial impact on how they feel and what they do. For example, someone who interprets a racing heart as a sign of a cardiac problem will certainly feel more anxious and possibly seek medical attention. In contrast, someone who attributes a racing heart to benign nervousness or normal somatic fluctuation will not experience increased anxiety and will continue going about their day.

Interpretation bias refers to the tendency to resolve ambiguity in a negative or threatening manner (i.e., jumping to negative conclusions). Although the specific content of biased interpretations may differ depending on a person's diagnosis (e.g., physical sensations in panic disorder, interpersonal rejection in social anxiety disorder), the processes by which biased interpretations maintain anxiety and the intervention approaches to address this cognitive bias are similar across disorders. Interpretation bias often manifests in the form of negative automatic thoughts (e.g., "what if I'm having a heart attack?"). Cognitive behavior therapy (CBT) targets such negative automatic thoughts via behavioral experiments and cognitive restructuring, an explicit process that

relies on specific techniques to help patients reappraise a situation in a more objective manner. Because therapists are rarely with a patient at the moment the patient encounters the ambiguous situation, cognitive restructuring is typically reappraising situations in an "offline" manner, usually before or after the situation occurs.

Although cognitive change via rational discussion can be effective (see Chapter 16), therapists and patients may experience challenges when attempting to apply cognitive techniques. Cognitive restructuring relies on the patients' ability to recognize when they are making an interpretation in the form of a negative automatic thought. Indeed, often the first step in cognitive therapy is to simply ask patients to record negative automatic thoughts to increase their awareness. This process of identifying negative automatic thoughts is difficult because interpretation bias can operate automatically, unintentionally, and outside of awareness (see Hirsch, Meeten, Krahé, & Reeder, 2016). In other words, our brains are constantly and efficiently resolving ambiguity for us. This "online" interpretation bias occurs at the moment of encountering ambiguity and, most of the time, we are not aware that we even made an interpretation. Because of the nature of interpretation bias, the typical method of identifying one negative interpretation from the week and evaluating it in a post hoc manner during a therapy session may be difficult and inefficient. Even when patients actually practice this skill daily, they will only evaluate one or two biased interpretations out of the countless interpretations made that day.

In contrast, interpretation bias modification (IBM), which is also known as cognitive bias modification for interpretation, aims to change interpretation bias in an "online" manner, more closely matching the natural way interpretations are made in the moment. IBM facilitates a more adaptive interpretive style via repeated practice on a cognitive training task. A typical IBM training task involves a computer program that presents many ambiguous situations in a short amount of time (e.g., 15 to 30 min). The cognitive task instructions encourage the individual to resolve each ambiguous situation in a benign manner. Thus, when an individual interprets an ambiguous situation in a benign manner, performance on the task improves. Speed and accuracy on IBM tasks are emphasized, making this intervention more game-like compared to the elaborate and introspective process of cognitive therapy.

IMPLEMENTATION

IBM programs are not yet accessible outside of research studies. However, IBM interventions will likely soon be available via online programs and smartphone apps. Thus, in this section, we describe the two most commonly used IBM tasks, helpful hints when implementing these interventions with patients, and various potential ways IBM may be implemented with anxious individuals.

Types of Interpretation Bias Modification

Numerous variations of IBM training tasks have been developed and tested in research settings. We describe the two most common types of IBM to date. For each, we present the most common variant of the task and note advantages and disadvantages of each task.

Ambiguous Scenario Training

Mathews and Mackintosh (2000) published the first IBM study using an ambiguous scenario training task. Since that time, the ambiguous scenario training task has become the most widely used type of IBM in research studies. Figure 20.1 illustrates the sequence of the task for one training trial. In this task, an ambiguous situation is described in approximately three sentences. In the most common version of the task, the scenario remains ambiguous until the final word, which is presented in the form of a word fragment.

> *Your partner asks you to go to an anniversary dinner that their company is holding. You have not met any of their work colleagues before. Getting ready to go, you think that the new people you meet will find you* [f r i_ _ _ _ y] (correct response: friendly).

FIGURE 20.1. Example of Ambiguous Scenario Training
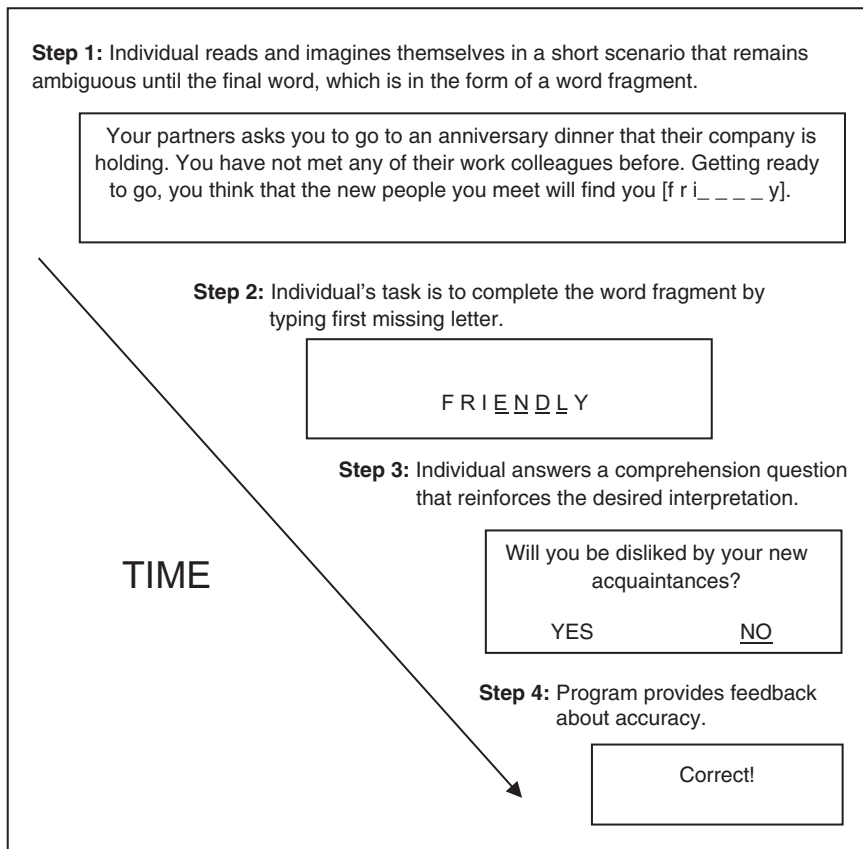
The task instructions are to complete the word fragment as quickly as possible, typically by pressing the key that corresponds to the first missing letter. To encourage a healthier interpretive style, this final word always resolves the ambiguous situation in a benign manner. Finally, after completing the word fragment, an individual answers a comprehension question that reinforces the benign interpretation, and individuals are given feedback about the accuracy of their response to the comprehension question. A single training session typically includes approximately 64 different training scenarios, which requires roughly 20 minutes to complete.

Word-Sentence Association Training

Another commonly used IBM training method is based on the Word-Sentence Association Paradigm (WSAP). The goal of the word-sentence association training is to reinforce benign interpretations and extinguish threat interpretations of ambiguous situations. To accomplish this goal, this task requires individuals to decide if a word representing either a threat ("criticize") or neutral/positive ("praise") interpretation is related to an ambiguous sentence that follows ("Your boss wants to meet with you"). Individuals indicate by button press if they think the word is related to the sentence. The program provides positive feedback ("You are correct!") if the individual endorses benign interpretations or rejects threat interpretations. Conversely, the program provides negative feedback ("You are incorrect!") if the individual endorses threat interpretations or rejects benign interpretations. Individuals complete the task as quickly and as accurately as possible, thereby prompting more automatic responding. A single training session typically includes 100 to 150 different word-sentence pairs, which requires roughly 15 minutes to complete. Figure 20.2 presents the task sequence.

Selecting an Interpretation Bias Modification Task

The Ambiguous Scenario Training task and the WSAP share many qualities and both are empirically supported. Both tasks involve numerous presentations of ambiguous situations and task contingencies that encourage healthier interpretations. Both tasks can be tailored to address specific anxiety concerns by changing the situations presented in the task (see Selection of Stimuli and Personalization). Both tasks also provide positive reinforcement ("correct!") as part of the training.

There are also some notable differences between the two tasks. First, the ambiguous scenario training task provides more context because it typically uses three-line paragraphs to describe an ambiguous situation. Patients may be better able to imagine themselves in the scenarios because of these additional details. In contrast, the WSAP relies on very brief, single sentences to convey an ambiguous situation. Although this feature limits the context, on the other hand, it may facilitate speedy and more automatic responding. In other words, it may help individuals more quickly "jump" to a positive conclusion.

FIGURE 20.2. Example of a Word-Sentence Association Paradigm Trial

Step 1: Word representing a threat or benign
interpretation appears briefly (500 ms).

criticize

Step 2: Ambiguous situation appears and remains
on screen until individual responds.

Your boss wants to meet with you

Step 3: Individual decides if word and sentence are
related and presses corresponding button.

YES   NO

TIME

Step 4: Program provides feedback about accuracy.
Correct = "yes" to benign / "no" to threat interpretations
Incorrect = "yes" to threat / "no" to benign interpretations

You are correct!

Second, the WSAP presents both benign (neutral and positive) and threat interpretations for each situation throughout the course of training, whereas the ambiguous scenario training task only presents benign resolutions. Because the WSAP requires people to make decisions about both negative and positive interpretations of the same situation, the task may allow people to notice how often they endorse the threat interpretation and how often they did not even think of the benign interpretation. Indeed, individuals who have completed WSAP training often comment that the WSAP increased their awareness of their tendency to jump to negative conclusions (Beard, Rifkin, Silverman, & Björgvinsson, 2019). Additionally, the WSAP's presentation of multiple ways of interpreting the same situation over hundreds of examples may reveal the inherent ambiguity of day to day situations.

Selection of Stimuli and Personalization

Both IBM tasks can be tailored to specific anxiety problems by selecting appropriate stimuli. Tables 20.1 and 20.2 provide examples of different stimuli for each of the tasks including references to the original articles. In most research studies, samples are selected based on symptoms of a specific anxiety

**TABLE 20.1. Example Ambiguous Scenario Training Stimuli
for Different Anxiety Disorders**

Social anxiety disorder[a,b]	*Adult*
	You are at a course that your company has sent you to attend. Your tutor asks each member of the group to stand up and introduce themselves. After your brief presentation, you guess that the others thought you sounded con - - d - - t (confident).
	A friend invites you to a dinner party that she is holding. She tells you who the other guests are, but you do not recognize any of the other names. You go anyway and on the way there, you think that the other guests will find you so - - a - le (sociable).
	Child and Adolescent[c]
	It is the first day of term. Your new teacher asks everyone to stand up and introduce themselves. After you have finished, you guess the others thought you sounded cl - v - r (clever).
Generalized anxiety disorder[d,e]	In your work, you often have to call radio stations to promote the business. Yesterday, you were unable to call all of the stations that you were supposed to and you think that your boss will put it down to you being b - sy (busy).
	You are given the task of arranging the annual office party. Despite having very little time, you do your best to prepare food, drink, and entertainment. As the night approaches, you think that the event will be a suc - - ss (success).
Panic disorder[f]	You are jogging. Your heart starts to beat quickly. This is in - igorating (invigorating).
Height phobia[g]	You are riding a Ferris wheel at a carnival. When you reach the top, you realize you are so high up that you can no longer see your family down below. This makes you uneasy, but your anxiety can be hand - ed (handled).
Spider phobia[h]	You wake up in the middle of the night and see something on your alarm clock. You realize it is a spider. You think that it is h - - mless (harmless).

Note. Examples drawn from [a]Salemink, van den Hout, and Kindt (2007a); [b]Salemink, van den Hout, and Kindt (2007b); [c]Lothmann, Holmes, Chan, and Lau (2011); [d]Hayes, Hirsch, Krebs, and Mathews (2010); [e]Hirsch, Hayes, and Mathews (2009); [f]Steinman and Teachman (2010); [g]Steinman and Teachman (2014); and [h]Teachman and Addison (2008).

TABLE 20.2. Example Word-Sentence Association Paradigm Stimuli for Different Anxiety Disorders

	Ambiguous sentence	Benign interpretation	Threat interpretation
Social anxiety disorder[a]	People laugh after something you said.	Funny	Embarrassing
	Your boss wants to meet with you.	Praise	Criticize
Generalized anxiety disorder[a]	You hear a loud noise at night.	Fireworks	Robber
	The chest was opened slowly.	Treasure	Hospital
Panic disorder[b]	You feel dizzy as you wait in line.	Momentary	Dangerous
	You start to feel nauseous at a restaurant.	Indigestion	Vomit
Intolerance of uncertainty[c]	Your doctor called.	Appointment	Disease
Height phobia[d]	You feel short of breath as you are climbing up a fire escape to a fourth story landing.	Normal	Alarming
	As you are cleaning leaves from your gutter, the ladder you are on makes a creaking sound.	Alright	Threatening

Note. Examples drawn from [a]Beard and Amir (2008); [b]Beard et al. (2017); [c]Oglesby, Raines, Short, Capron, and Schmidt (2016); and [d]Steinman and Teachman (2014).

diagnosis (e.g., social anxiety disorder, generalized anxiety disorder), and the same stimuli set is used for all participants. Thus, social anxiety stimuli are presented to socially anxious samples and the stimuli are likely relevant to each person. This degree of personalization appears to be sufficient for IBM to induce changes in interpretive style and emotional reactivity.

It is currently unknown whether further personalization would enhance acceptability, task engagement, or clinical effects. However, IBM can be further personalized to the individual in a variety of ways. For example, prior to starting IBM, individuals could complete assessment versions of the training tasks (e.g., in the WSAP, the assessment version does not provide feedback about responses). The training version could then only present situations that the individual got "wrong" in the assessment. Similarly, individuals could rate all potential ambiguous scenarios or sentences for how negative or positive they were to them personally using a Likert scale (−3 to +3; Lichtenthal et al., 2017). These ratings can then be used to create individualized stimulus sets that only contain situations rated as negative (implying the individual originally interpreted the sentence in a negative manner). Advantages of these methods are that they should yield more personally relevant situations; a disadvantage is that they are time-consuming for a patient to rate hundreds of potential stimuli.

Simple checklists may be used to ask patients which of the fear domains concern them and then only present situations from those domains. Thus, an individual with generalized anxiety who worries about finances would see situations related to this domain but not see health-related situations. Finally, personalization may also include aspects of the individual's life. For example, this level of personalization would ensure that someone who does not have children would not see situations related to parenting. To fully personalize IBM, computerized algorithms have been developed that incorporate anxiety disorder diagnosis, fear domains, and life circumstances to create a unique stimulus set maximally relevant to the individual (Beard et al., 2017).

Dosage

Research protocols have tested a variety of doses of IBM, and there are currently no firm guidelines about this. Each session typically presents 64 ambiguous scenario training trials or 100 WSAP trials and requires 15 to 30 minutes, depending on the individual's speed of reading and decision making. The most common protocol tested in clinical samples involves eight sessions completed over 4 weeks (twice per week). However, variations have also been tested, such as daily sessions over a 1-week period. Overall, IBM has led to positive effects in relatively brief time periods. It is unknown whether long-term practice would lead to larger, more generalizable or sustained benefits. In clinical practice, it is likely that the dosage will depend upon the individual patient's needs and access to the IBM program. Similar to CBT, some patients may require many sessions to achieve results, whereas others may benefit more quickly. If delivered via an online program or smartphone app, an acute phase of IBM intervention could easily be followed by a maintenance phase or booster sessions.

Interpretation Bias Modification Delivery Methods

IBM interventions are not yet available to clinicians or consumers. Thus, in this section, we describe the delivery methods and settings researched to date.

At a Provider's Office

Most research studies testing this intervention delivered it via experimental software programs installed on a computer and required individuals to come into a research lab or clinic to complete the intervention. Although part of IBM's appeal is the potential to deliver it online in peoples' homes, there may be benefits related to coming into an office setting to complete IBM. Coming into an office often requires individuals to face their feared situations (e.g., social interactions, anxious arousal). Exposing oneself to these feared situations twice a week for 4 weeks, for example, could positively affect anxiety on its own. Moreover, it ensures that individuals are encountering ambiguous situations in their daily lives, providing opportunity for new interpretive styles to start taking effect. Related to this, it is possible that IBM may work

better when people's fears are activated. Thus, particularly for people with social anxiety, coming into an office and interacting with staff may activate dysfunctional beliefs and heighten anxiety during the IBM intervention, enhancing the effects of the treatment when compared to using the intervention in the comfort of home. An office setting also ensures a quiet, uninterrupted IBM session. More specifically, several potential implementation methods have been developed and tested for IBM.

Stand-Alone Self-Help

Because IBM is typically delivered via a computer task, it is easily implemented as a form of self-help. Several studies have tested IBM as an online intervention with no clinician involvement or human contact (e.g., Pictet, Jermann, & Ceschi, 2016). There may be benefits to delivering it online or via a smartphone app. Home delivery overcomes many of the barriers to accessing treatment (e.g., transportation, scheduling, childcare, stigma). It also expands the dosing options, such as shorter, more frequent training sessions throughout the day. This method may be preferable for individuals who do not have access to therapy, who are not interested in face-to-face therapy, or who have symptoms that do not require a higher intensity treatment. However, like any online treatment, attrition is more likely with no human contact.

Preparation for Cognitive Behavior Therapy

Several studies have tested IBM as a precursor to face-to-face or online CBT (e.g., Brosan, Hoppitt, Shelfer, Sillence, & Mackintosh, 2011; Williams, Blackwell, Mackenzie, Holmes, & Andrews, 2013). This method might be implemented for therapeutic or logistical reasons. Therapeutically, it is possible that completing IBM would help patients better engage in CBT. If IBM successfully induces more flexibility in interpretive style, individuals should be more amenable to cognitive restructuring following IBM. Additionally, if an individual is better able to generate positive interpretations, behavioral exercises may be perceived as a more positive experience. Logistically, IBM may be used prior to face-to-face CBT in circumstances of long waiting lists.

Concurrent With Cognitive Behavior Therapy

IBM may also benefit patients who are currently engaging in CBT. Either IBM task could be used as homework exercises to facilitate the more top-down explicit approach of CBT. For example, the WSAP task may be used to help individuals more efficiently learn to identify negative automatic thoughts. In the WSAP task, individuals respond to both negative and benign interpretations of 100+ situations in 15 minutes. This unique experience may increase an individual's awareness of their biases as they notice how often they automatically jumped to a negative conclusion. In other words, this form of IBM may illuminate the brain's process of efficiently resolving ambiguous situations in daily life before individuals are aware that they are making an interpretation (e.g., "It was helpful by simply making me aware of how I react to situations").

Primary Care

IBM may be an ideal low-intensity intervention in primary care settings. Most individuals first seek treatment for anxiety disorders from their primary care physician (Verhaak et al., 2009), and individuals with anxiety disorders are among the highest utilizers of primary care (Simon, Ormel, VonKorff, & Barlow, 1995). Although the integration of behavioral health providers into primary care practices is becoming more common, there remains a huge unmet treatment need. Psychological interventions like IBM are unique and appealing for this setting because they can be "prescribed" and monitored by a primary care physician, similar to pharmacotherapy. Primary care patients could (a) complete IBM in the office and check in with clinic staff, (b) complete IBM at home, or (c) both.

Helpful Hints

In this section, we provide a list of things to consider before implementing IBM with patients. Some recommendations are based on empirical evidence, whereas others come from hands on experience delivering IBM to different populations in a variety of real-world settings.

Provide a Rationale

Like any treatment, providing a clear and compelling rationale is important for initial buy-in from patients as well as for setting expectations about the nature of the intervention (e.g., computerized, repetitive training). Developers of IBM have typically referred to this intervention as changing "mental habits." An example of a written informational handout is provided in Exhibit 20.1. This specific IBM rationale was used in a recent study testing IBM as an augmentation to a CBT-based partial hospital program (Beard et al., 2015).

Prepare for and Normalize Errors

It is important that individuals expect to make many errors in IBM (i.e., on the comprehension question in the ambiguous scenario task and on the relatedness judgment in the WSAP). Thus, prior to starting IBM, explicitly inform individuals that they should expect to get many trials "incorrect." Emphasize that if they got everything correct at the beginning, then they would not actually need or benefit from the intervention. At the same time, encourage individuals to use the program's feedback to improve accuracy before starting each session. Additionally, it is helpful to tell people that it is okay if they "miss" a word in the WSAP, as the words flash very quickly. If they do not see a particular word, they should just guess on that trial and get ready to attend to the next one.

Facilitate Generalization

IBM will only be helpful if individuals start interpreting situations differently in their daily life (not just on the computer program!). There are not yet empirical guidelines for facilitating generalization in IBM, but we offer some suggestions. It may be helpful to ask patients about how they are applying

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EXHIBIT 20.1

Example Interpretation Bias Modification (IBM) Treatment Rationale

How does IBM work?

No matter what caused your anxiety, the way you've learned to think about situations can keep it going. It's not your fault that you have these thinking habits, and IBM can help.

IBM encourages you to interpret situations in a healthier way. Individuals who have completed previous versions of I-Change said that the program increased their awareness of their negative thinking habits and helped them become more flexible in their thinking. People find it most beneficial if they try to apply what they learn in the computer program to situations in their actual life.

IBM targets your interpretation style. Because in everyday life many situations are ambiguous (can be interpreted in more than one way), a negative interpretation bias will lead to most situations being seen as negative. Moreover, by expecting a negative outcome people often create what is called a "self-fulfilling prophecy." For example, if you walk into a party and expect people will not want to talk to you, you may avoid conversation and, as a result, it is more likely that they will not talk to you.

The IBM program is very simple and repetitive. These mental habits are often hard to control. These habits are so automatic that it is very difficult to "catch" or change on purpose. Gaining control over automatic mental habits is like strengthening a muscle in your body, it takes regular training. As you repeat this training each day, it will become easier to do, and you will be faster and more accurate.

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what they learned from the computer task to their daily lives. Many individuals will be able to generate specific examples of situations in which they noticed themselves jumping to a negative conclusion and thinking about the alternative interpretations provided in the computer program. Other individuals may start doing things they used to avoid, such as going to the store. Reinforcing such behavioral changes in the context of a purely cognitive intervention may be especially important. Introducing new situations in the IBM task at each session could also facilitate generalization as more and more real-life situations are reinterpreted.

Harness the Power of Imagery

The ambiguous scenario training form of IBM has been found to be most effective when positive imagery is incorporated. Thus, it is critical for individuals to imagine themselves in each scenario. Failure to imagine oneself in the positively resolved scenarios may actually lead to negative mood effects if people compare themselves to the "person" in the scenario (Standage, Harris, & Fox, 2014). In addition to asking patients to form an image of the scenario in their mind, it may be helpful to ask patients to describe a subset of scenarios in order to ensure that they are imagining being in the scenario itself, rather than imagining another person in that scenario. This issue also speaks to the importance of using personalized, appropriate stimuli, so that patients can readily form a relevant image in their mind.

Track Progress

Patients may find IBM more engaging and rewarding if they track their accuracy and speed across sessions. Graphing these scores over time may be especially impactful. Online programs or smartphone apps will likely automatically incorporate this feature. Additionally, tracking progress can alert providers to problems. For example, if accuracy does not improve over time, this could indicate several potential issues, such as (a) not understanding the task, (b) actively resisting alternative interpretations, or (c) limited literacy.

OUTCOME INDICATORS

Multiple studies have confirmed that IBM is efficacious at modifying negative interpretations of ambiguity (for reviews, see Hirsch et al., 2016; Jones & Sharpe, 2017; Menne-Lothmann et al., 2014). In turn, changes in interpretative style resulting from IBM are associated with reductions in anxiety, worry, and negative mood more broadly (reviewed in Hirsch et al., 2016; Menne-Lothmann et al., 2014). Objective outcome indicators can assess if an IBM intervention is having the desired clinical effect and if an individual's interpretive style is changing beyond the task itself.

Assessment versions exist for both Ambiguous Scenario Training paradigms and the WSAP. Thus, a patient's baseline level of interpretation bias can be assessed by their initial responses to ambiguous stimuli. This baseline bias can then be compared with a patient's performance on test items administered after IBM. For Ambiguous Scenario Training, this involves a scenario recognition test; for the WSAP, it involves word–sentence pairs presented without feedback. In the scenario recognition test, patients are provided with an ambiguous situation similar to the training itself; unlike in the training, the final word in this situation maintains the scenario as ambiguous. Patients are then given four possible interpretations of this situation (including positive and negative interpretations) and are asked to rate the similarity of these interpretations to their own interpretation of the situation. Yet, assessing change in interpretive style solely based on IBM task performance limits the conclusions that can be drawn regarding the generalizability of training effects. For this reason, self-report measures of interpretation bias can also assess effects of IBM.

Many questionnaire measures share conceptual similarities to Ambiguous Scenario Training, in that they assess individuals' responses to brief descriptions of ambiguous situations. Questionnaires vary in terms of their response format, including open-response, ranked choice, and multiple choice. Examples of these measures are described below; more comprehensive reviews of interpretation bias paradigms are available from several other sources (e.g., Hirsch et al., 2016; Schoth & Liossi, 2017).

Ambiguous Social Situation Interpretation Questionnaire

The Ambiguous Social Situation Interpretation Questionnaire (ASSIQ) is a self-report measure that includes brief descriptions of both social (14 items)

and nonsocial (10 items) ambiguous scenarios, followed by the prompt "Why?" (Stopa & Clark, 2000). The ASSIQ is a comprehensive measure of interpretive style, with interpretations of ambiguity assessed in three different ways for each scenario. First, individuals write an open-ended answer. Second, individuals read three possible interpretations of each scenario (one negative, one neutral, one positive) and rank order the likelihood they would think of each interpretation "in a similar situation." Third, participants rate the believability of these three interpretations on a 0–8 scale. This scale may be particularly relevant for patients with anxiety about social situations. Similar questionnaires that ask individuals to rank the likelihood of example interpretations are available as well (e.g., see Amir, Foa, & Coles, 1998).

Ambiguous Scenarios Test-Depression

The Ambiguous Scenarios Test-Depression (AST-D; Berna, Lang, Goodwin, & Holmes, 2011) was developed to assess interpretative styles relevant to depressed mood, but the scale has also been correlated with anxiety symptoms (e.g., Cooper & Wade, 2015), and the content of the ambiguous scenarios are general enough that this measure may also be relevant for assessing interpretation bias in fear and anxiety disorders. Participants read a series of 24 ambiguous scenarios and are asked to imagine themselves in each; after reading the scenario, participants rate the "pleasantness" of the image they are imagining on a 9-point scale, ranging from *extremely unpleasant* to *extremely pleasant* (Berna et al., 2011). Thus, a more positive or negative interpretive style can be inferred from the overall "pleasantness" of a person's imagined responses to ambiguity. The AST-D is relatively brief to administer, and it has the advantage of yielding one overall score of the "pleasantness" of a person's imagined interpretations. The scenarios provided on the AST-D contain a range of content, including themes related to performance (e.g., "You have recently taken an important exam. Your results arrive with an unexpected letter of explanation about your grade"), physical threat (e.g., "You are lost in a part of a big city you don't know well. You ask someone on the streets for directions when they pull something out of their pocket"), and social anxiety (e.g., "You go to a wedding where you know very few other guests. After the party, you reflect on how the other guests behaved").

Interpretation and Judgmental Questionnaire

The Interpretation and Judgmental Questionnaire (IJQ; Voncken, Bögels, & de Vries, 2003) is a self-report interpretation bias measure that includes descriptions of 20 ambiguous social situations and four ambiguous nonsocial situations. After reading each description, participants rank the likelihood of four different interpretations from 1 (*least likely*) to 4 (*most likely*). Each situation includes an ambiguous interpretation, a positive interpretation, and two negative interpretations (one "mildly" and one "profoundly" negative). Overall interpretation bias can be inferred by calculating the average ranking of profoundly negative interpretations, with higher scores indicating a more

negative interpretive bias. As with the ASSIQ, the IJQ may be a particularly good measure for patients with social anxiety.

EMPIRICAL SUPPORT

Evidence supporting the efficacy of IBM comes from a variety of settings and samples. To date, the available data are limited primarily by small sample sizes, but they are rigorous in design with double-blind randomized controlled trials comparing IBM with a placebo task. IBM has been evaluated among individuals diagnosed with specific anxiety disorders as well as in people without a formal diagnosis who report elevated anxiety symptoms on standardized measures. When studies of IBM are aggregated together, there is consistent evidence that IBM successfully modifies interpretive styles across these varied settings and symptom groups (Hallion & Ruscio, 2011; Jones & Sharpe, 2017; Menne-Lothmann et al., 2014). In other words, there is clear evidence that IBM is effective at engaging the underlying mechanism of interpretation bias.

To date, what is less clear is the extent to which IBM can be used as a clinical intervention for specific fear and anxiety disorders. The most recent empirical reviews of IBM show that it is efficacious for reducing anxiety (Jones & Sharpe, 2017) and negative affect (Menne-Lothmann et al., 2014); however, there is not yet consistent evidence that IBM can be used as intervention in clinical samples (Cristea, Kok, & Cuijpers, 2015; Hirsch et al., 2016). Evidence supports the efficacy of IBM (alone or in combination with other cognitive bias modification methods) in reducing multiple transdiagnostic processes that are relevant for fear and anxiety disorders, including state anxiety (Brosan et al., 2011; Hoppitt, Illingworth, MacLeod, Hampshire, Dunn, & Mackintosh, 2014), trait anxiety (Mathews, Ridgeway, Cook, & Yiend, 2007; Salemink, van den Hout, & Kindt, 2009), anticipatory anxiety (Murphy, Hirsch, Mathews, Smith, & Clark, 2007), social anxiety (Beard & Amir, 2008; Beard, Weisberg, & Amir, 2011; Brettschneider, Neumann, Berger, Renneberg, & Boettcher, 2015; Hoppitt et al., 2014), anxiety sensitivity (Capron, Norr, Allan, & Schmidt, 2017; MacDonald, Koerner, & Antony, 2013; Steinman & Teachman, 2010), and worry (Hayes, Hirsch, Krebs, & Mathews, 2010). Several of these studies have included patients diagnosed with specific anxiety disorders, such as generalized anxiety disorder (Brosan et al., 2011; Hayes et al., 2010), social anxiety disorder (Amir & Taylor, 2012; Beard et al., 2011), or significant symptoms of specific phobias (Steinman & Teachman, 2014; Teachman & Addison, 2008). Few studies have tested the long-term effects of IBM. Preliminary evidence suggests that cognitive and symptom changes may endure for at least 2 weeks and up to 6 months (Blackwell et al., 2015; Pictet et al., 2016; Torkan et al., 2014). Research in clinical samples is ongoing, as more studies are needed to develop treatment guidelines for the use of IBM in clinical practice.

TROUBLESHOOTING

Patient-Specific Considerations

Children and Adolescents

IBM interventions have been developed and tested in children and adolescents using age-appropriate stimuli (Lothmann, Holmes, Chan, & Lau, 2011; Vassilopoulos, Banerjee, & Prantzalou, 2009). Younger individuals may be more amenable to this type of intervention because their mental habits are less ingrained, and they have less prior negative memories to challenge the positive alternatives. Eventually, IBM may even be a good prevention strategy for children at risk for developing anxiety disorders. However, more large clinical trials in children and adolescents are needed to determine the usefulness of IBM.

Sociocultural Considerations

Most initial development studies of IBM took place in university psychology departments. Thus, the original stimulus sets are likely most relevant to young adults attending a 4-year college. When selecting an IBM program to use with a patient, it is important to ensure that the stimulus set is not only personally relevant to their specific anxiety symptoms (e.g., social anxiety stimuli for a socially anxious patient), but also to their demographic characteristics. For example, for nonstudents or older adults, it is important that stimuli do not exclusively (or predominantly) focus on classroom situations.

   Finally, when implementing any type of cognitive therapy, such as cognitive restructuring or IBM, it is crucial for the clinician to be aware of different ethno-racial and religious minority experiences. For example, a Black male patient may respond differently to the ambiguous situation "the sales clerk calls in the manager" than a White woman would. For any patient with a stigmatized identity, it may be important to discuss how sociocultural factors, such as discrimination, have shaped their interpretive style. With patients identifying as a sexual or gender minority, it is important to make sure stimuli do not include heterosexist language.

Baseline Level of Interpretation Bias

IBM is most appropriate for individuals for whom interpretation bias maintains their anxiety. An individual who already interprets most situations positively may not benefit from such an intervention.

Computer Anxiety and Credibility

Individuals who experience anxiety when using new technology or computers may be hesitant to try IBM. Additionally, some people may be skeptical about a computer program helping with a mental health problem. It may be helpful to spend additional time presenting the treatment rationale and empirical evidence with these individuals.

Patient Reactions

Individuals experience a range of reactions to IBM. Although most are positive, others can be negative. Such negative reactions can often be prevented or mitigated if the IBM provider anticipates problems. For example, particularly for the Ambiguous Scenario Training task, it is important to emphasize that individuals need to imagine themselves in the situation, rather than compare their own experience to the "character" in the situation. Comparing oneself to the positive outcomes in each scenario can worsen mood. Individuals who are extremely sensitive to failure or rejection may also experience increased distress when first attempting IBM, particularly for the WSAP task that tells people they are incorrect. Providers should emphasize to all individuals that they are expected to get most trials incorrect at first.

Finally, some individuals with extremely rigid thinking may not "buy-in" to IBM. Such individuals may get stuck on the fact that the situations presented are inherently ambiguous and resist the program from guiding them to a particular resolution. With additional discussion, individuals may continue with IBM and eventually become more flexible in their thinking.

Technological Considerations

As with all computer or smartphone delivered interventions, technological programs may arise. When using IBM with patients, it is important to develop a plan for handling any technological problems (e.g., whom patients should call, whether they should wait until the next face-to-face session). Therapists should also be aware of the various issues surrounding recommending health care smartphone apps to patients (see American Psychiatric Association, 2018), including how to evaluate an app's data security.

CONCLUSION

Interpretation bias is a form of cognitive bias in which ambiguous situations are appraised as negative or threatening. Although the domain of interpretation bias can vary by diagnosis (e.g., social anxiety vs. panic), the general process of interpreting ambiguity in a negative manner is transdiagnostic. IBM encompasses a family of cognitive training programs, typically administered using a computer or smartphone, designed to help individuals practice generating benign or positive interpretations of ambiguity. Rather than attempting to modify negative interpretations out of the situational context (prospectively or retrospectively, as in cognitive restructuring techniques), IBM allows for online, in-the-moment practice with modifying interpretations. Many research studies have established IBM's efficacy in modifying underlying interpretation biases. Research on IBM has also yielded encouraging findings that may eventually lead to integrating IBM into clinical care and providing more personalized treatment options.

REFERENCES

American Psychiatric Association. (2018). *App evaluation model*. Retrieved from http://www.psychiatry.org/psychiatrists/practice/mental-health-apps/app-evaluation-model

Amir, N., Foa, E. B., & Coles, M. E. (1998). Negative interpretation bias in social phobia. *Behaviour Research and Therapy*, *36*, 945–957. http://dx.doi.org/10.1016/S0005-7967(98)00060-6

Amir, N., & Taylor, C. T. (2012). Interpretation training in individuals with generalized social anxiety disorder: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 80,* 497–511. http://dx.doi.org/10.1037/a0026928

Beard, C., & Amir, N. (2008). A multi-session interpretation modification program: Changes in interpretation and social anxiety symptoms. *Behaviour Research and Therapy*, *46*, 1135–1141. http://dx.doi.org/10.1016/j.brat.2008.05.012

Beard, C., Gonsalves, M., Fuchs, C., Arriaga, E., Francis, S. F., Fletcher, V., . . . Weisberg, R. B. (2017, April). A cognitive bias modification treatment for anxiety disorders in primary care. In R. Brady (Chair), *Novel modifications of evidence-based treatments of anxiety for delivery in primary care settings*. Symposium conducted at the 37th annual meeting of the Anxiety and Depression Association of America, San Francisco, CA.

Beard, C., Rifkin, L., Lee, J., Garner, L., Stein, A., Cook, A., & Björgvinsson, T. (2015, November). A randomized controlled trial of a transdiagnostic cognitive bias modification-interpretation adjunct treatment in a partial hospital. In C. Beard (Chair), *Changing minds via cognitive bias modification: Expanding to new populations and settings.* Symposium conducted at the 49th annual meeting of the Association for Behavioral and Cognitive Therapies, Chicago, IL.

Beard, C., Rifkin, L. S., Silverman, A. L., & Björgvinsson, T. (2019). Translating CBM-I into real world settings: Augmenting a CBT-based psychiatric hospital program. *Behavior Therapy*, *50*, 515–530. http://dx.doi.org/10.1016/j.beth.2018.09.002

Beard, C., Weisberg, R. B., & Amir, N. (2011). Combined cognitive bias modification treatment for social anxiety disorder: A pilot trial. *Depression and Anxiety*, *28*, 981–988. http://dx.doi.org/10.1002/da.20873

Berna, C., Lang, T. J., Goodwin, G. M., & Holmes, E. A. (2011). Developing a measure of interpretation bias for depressed mood: An ambiguous scenarios test. *Personality and Individual Differences*, *51*, 349–354. http://dx.doi.org/10.1016/j.paid.2011.04.005

Blackwell, S. E., Browning, M., Mathews, A., Pictet, A., Welch, J., Davies, J., . . . Holmes, E. A. (2015). Positive imagery-based cognitive bias modification as a web-based treatment tool for depressed adults: A randomized controlled trial. *Clinical Psychological Science*, *3*, 91–111. http://dx.doi.org/10.1177/2167702614560746

Brettschneider, M., Neumann, P., Berger, T., Renneberg, B., & Boettcher, J. (2015). Internet-based interpretation bias modification for social anxiety: A pilot study. *Journal of Behavior Therapy and Experimental Psychiatry*, *49*, 21–29. http://dx.doi.org/10.1016/j.jbtep.2015.04.008

Brosan, L., Hoppitt, L., Shelfer, L., Sillence, A., & Mackintosh, B. (2011). Cognitive bias modification for attention and interpretation reduces trait and state anxiety in anxious patients referred to an out-patient service: Results from a pilot study. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*, 258–264. http://dx.doi.org/10.1016/j.jbtep.2010.12.006

Capron, D. W., Norr, A. M., Allan, N. P., & Schmidt, N. B. (2017). Combined "top-down" and "bottom-up" intervention for anxiety sensitivity: Pilot randomized trial testing the additive effect of interpretation bias modification. *Journal of Psychiatric Research*, *85*, 75–82. http://dx.doi.org/10.1016/j.jpsychires.2016.11.003

Cooper, J. L., & Wade, T. D. (2015). The relationship between memory and interpretation biases, difficulties with emotion regulation, and disordered eating in young

women. *Cognitive Therapy and Research*, *39*, 853–862. http://dx.doi.org/10.1007/s10608-015-9709-1

Cristea, I. A., Kok, R. N., & Cuijpers, P. (2015). Efficacy of cognitive bias modification interventions in anxiety and depression: Meta-analysis. *The British Journal of Psychiatry*, *206*, 7–16. http://dx.doi.org/10.1192/bjp.bp.114.146761

Hallion, L. S., & Ruscio, A. M. (2011). A meta-analysis of the effect of cognitive bias modification on anxiety and depression. *Psychological Bulletin*, *137*, 940–958. http://dx.doi.org/10.1037/a0024355

Hayes, S., Hirsch, C. R., Krebs, G., & Mathews, A. (2010). The effects of modifying interpretation bias on worry in generalized anxiety disorder. *Behaviour Research and Therapy*, *48*, 171–178. http://dx.doi.org/10.1016/j.brat.2009.10.006

Hirsch, C. R., Hayes, S., & Mathews, A. (2009). Looking on the bright side: Accessing benign meanings reduces worry. *Journal of Abnormal Psychology*, *118*, 44–54. http://dx.doi.org/10.1037/a0013473

Hirsch, C. R., Meeten, F., Krahé, C., & Reeder, C. (2016). Resolving ambiguity in emotional disorders: The nature and role of interpretation biases. *Annual Review of Clinical Psychology*, *12*, 281–305. http://dx.doi.org/10.1146/annurev-clinpsy-021815-093436

Hoppitt, L., Illingworth, J. L., MacLeod, C., Hampshire, A., Dunn, B. D., & Mackintosh, B. (2014). Modifying social anxiety related to a real-life stressor using online Cognitive Bias Modification for interpretation. *Behaviour Research and Therapy*, *52*, 45–52. http://dx.doi.org/10.1016/j.brat.2013.10.008

Jones, E. B., & Sharpe, L. (2017). Cognitive bias modification: A review of meta-analyses. *Journal of Affective Disorders*, *223*, 175–183. http://dx.doi.org/10.1016/j.jad.2017.07.034

Lichtenthal, W. G., Corner, G. W., Slivjak, E. T., Roberts, K. E., Li, Y., Breitbart, W., . . . Beard, C. (2017). A pilot randomized controlled trial of cognitive bias modification to reduce fear of breast cancer recurrence. *Cancer*, *123*, 1424–1433. http://dx.doi.org/10.1002/cncr.30478

Lothmann, C., Holmes, E. A., Chan, S. W. Y., & Lau, J. Y. F. (2011). Cognitive bias modification training in adolescents: Effects on interpretation biases and mood. *The Journal of Child Psychology and Psychiatry*, *52*, 24–32. http://dx.doi.org/10.1111/j.1469-7610.2010.02286.x

MacDonald, E. M., Koerner, N., & Antony, M. M. (2013). Modification of interpretive bias: Impact on anxiety sensitivity, information processing and response to induced bodily sensations. *Cognitive Therapy and Research*, *37*, 860–871. http://dx.doi.org/10.1007/s10608-012-9519-7

Mathews, A., & Mackintosh, B. (2000). Induced emotional interpretation bias and anxiety. *Journal of Abnormal Psychology*, *109*, 602–615. http://dx.doi.org/10.1037/0021-843X.109.4.602

Mathews, A., Ridgeway, V., Cook, E., & Yiend, J. (2007). Inducing a benign interpretational bias reduces trait anxiety. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*, 225–236. http://dx.doi.org/10.1016/j.jbtep.2006.10.011

Menne-Lothmann, C., Viechtbauer, W., Höhn, P., Kasanova, Z., Haller, S. P., Drukker, M., . . . Lau, J. Y. F. (2014). How to boost positive interpretations? A meta-analysis of the effectiveness of cognitive bias modification for interpretation. *PLoS One*, *9*, e100925. http://dx.doi.org/10.1371/journal.pone.0100925

Murphy, R., Hirsch, C. R., Mathews, A., Smith, K., & Clark, D. M. (2007). Facilitating a benign interpretation bias in a high socially anxious population. *Behaviour Research and Therapy*, *45*, 1517–1529. http://dx.doi.org/10.1016/j.brat.2007.01.007

Oglesby, M. E., Raines, A. M., Short, N. A., Capron, D. W., & Schmidt, N. B. (2016). Interpretation bias for uncertain threat: A replication and extension. *Journal of Behavior Therapy and Experimental Psychiatry*, *51*, 35–42. http://dx.doi.org/10.1016/j.jbtep.2015.12.006

Pictet, A., Jermann, F., & Ceschi, G. (2016). When less could be more: Investigating the effects of a brief Internet-based imagery cognitive bias modification intervention in

depression. *Behaviour Research and Therapy*, *84*, 45–51. http://dx.doi.org/10.1016/j.brat.2016.07.008

Salemink, E., van den Hout, M., & Kindt, M. (2007a). Trained interpretive bias and anxiety. *Behaviour Research and Therapy*, *45*, 329–340. http://dx.doi.org/10.1016/j.brat.2006.03.011

Salemink, E., van den Hout, M., & Kindt, M. (2007b). Trained interpretive bias: Validity and effects on anxiety. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*, 212–224. http://dx.doi.org/10.1016/j.jbtep.2006.10.010

Salemink, E., van den Hout, M., & Kindt, M. (2009). Effects of positive interpretive bias modification in highly anxious individuals. *Journal of Anxiety Disorders*, *23*, 676–683. http://dx.doi.org/10.1016/j.janxdis.2009.02.006

Schoth, D. E., & Liossi, C. (2017). A systematic review of experimental paradigms for exploring biased interpretation of ambiguous information with emotional and neutral associations. *Frontiers in Psychology*, *8*, 171. http://dx.doi.org/10.3389/fpsyg.2017.00171

Simon, G., Ormel, J., VonKorff, M., & Barlow, W. (1995). Health care costs associated with depressive and anxiety disorders in primary care. *The American Journal of Psychiatry*, *152*, 352–357. http://dx.doi.org/10.1176/ajp.152.3.352

Standage, H., Harris, J., & Fox, E. (2014). The influence of social comparison on cognitive bias modification and emotional vulnerability. *Emotion*, *14*, 170–179. http://dx.doi.org/10.1037/a0034226

Steinman, S. A., & Teachman, B. A. (2010). Modifying interpretations among individuals high in anxiety sensitivity. *Journal of Anxiety Disorders*, *24*, 71–78. http://dx.doi.org/10.1016/j.janxdis.2009.08.008

Steinman, S. A., & Teachman, B. A. (2014). Reaching new heights: Comparing interpretation bias modification to exposure therapy for extreme height fear. *Journal of Consulting and Clinical Psychology*, *82*, 404–417. http://dx.doi.org/10.1037/a0036023

Stopa, L., & Clark, D. M. (2000). Social phobia and interpretation of social events. *Behaviour Research and Therapy*, *38*, 273–283. http://dx.doi.org/10.1016/S0005-7967(99)00043-1

Teachman, B. A., & Addison, L. M. (2008). Training non-threatening interpretations in spider fear. *Cognitive Therapy and Research*, *32*, 448–459. http://dx.doi.org/10.1007/s10608-006-9084-z

Torkan, H., Blackwell, S. E., Holmes, E. A., Kalantari, M., Neshat-Doost, H. T., Maroufi, M., & Talebi, H. (2014). Positive imagery cognitive bias modification in treatment-seeking patients with major depression in Iran: A pilot study. *Cognitive Therapy and Research*, *38*, 132–145. http://dx.doi.org/10.1007/s10608-014-9598-8

Vassilopoulos, S. P., Banerjee, R., & Prantzalou, C. (2009). Experimental modification of interpretation bias in socially anxious children: Changes in interpretation, anticipated interpersonal anxiety, and social anxiety symptoms. *Behaviour Research and Therapy*, *47*, 1085–1089. http://dx.doi.org/10.1016/j.brat.2009.07.018

Verhaak, P. F. M., Prins, M. A., Spreeuwenberg, P., Draisma, S., van Balkom, T. J. L. M., Bensing, J. M., . . . Penninx, B. W. J. H. (2009). Receiving treatment for common mental disorders. *General Hospital Psychiatry*, *31*, 46–55. http://dx.doi.org/10.1016/j.genhosppsych.2008.09.011

Voncken, M. J., Bögels, S. M., & de Vries, K. (2003). Interpretation and judgmental biases in social phobia. *Behaviour Research and Therapy*, *41*, 1481–1488. http://dx.doi.org/10.1016/S0005-7967(03)00143-8

Williams, A. D., Blackwell, S. E., Mackenzie, A., Holmes, E. A., & Andrews, G. (2013). Combining imagination and reason in the treatment of depression: A randomized controlled trial of Internet-based cognitive-bias modification and Internet-CBT for depression. *Journal of Consulting and Clinical Psychology*, *81*, 793–799. http://dx.doi.org/10.1037/a0033247

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